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By- Amidon, Edmund

THE EFFECT UPON THE BEHAVIOR AND ATTITUDES OF STUDENT TEACHERS OF TRAINING COOPERATING TEACHERS AND STUDENT TEACHERS IN THE USE OF INTERACTION ANALYSIS AS A CLASSROOM OBSERVATIONAL TECHNIQUE.

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In a 2 1/2-year study of the application of interaction analysis (a method of classroom observation) to preservice teacher education, approximately 40 secondary student teachers were involved in an experiment during each of 3 semesters. A 2 by 2 factorial design made it possible to test the influence of 2 independent variables (student teacher training in interaction analysis or learning theory, and cooperating teacher training in interaction analysis or learning theory) upon the dependent variables: attitudes, teaching effectiveness, teaching patterns, and pupil perception of student teachers. Volunteer cooperating teachers were randomly assigned to the 4 randomized groups of student teachers. Twelve hypotheses were tested by analysis of variance, but only one was accepted: student teachers taught interaction analysis are more indirect, accepting, and supportive in working with pupils than those not so taught. There is some evidence that their pupils perceive the indirectness. They were not, however, rated as more effective teachers or as having more positive attitudes toward teaching. The results indicated no systematic effect of the training of cooperating teachers. Included are 76 statistical tables, a 79-item bibliography, and a 232-page appendix of skill sessions and materials used in experimental courses, individual teacher data and summary matrices, and instruments used in the study. (JS)

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Temple University

of the Commonwealth System of Higher Education

PROJECT ON STUDENT TEACHING

Using Interaction Analysis in the Student Teaching Program

Edmund Amidon

Project Director

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PROJECT ON STUDENT TEACHING

The Effects of Teaching Interaction Analysis to Student Teachers

Edmund Amidon
Project Director

Professional Staff:

Norma Furst	Project Associate
Gertrude Moskowitz	Instructor
Anita Simon	Instructor
Wilford Weber	Graduate Assistant
Thomas Samph	Graduate Assistant
Evan Powell	Graduate Assistant

"The Effect Upon the Behavior and Attitudes of Student Teachers of Training Cooperating Teachers and Student Teachers in the Use of Interaction Analysis as a Classroom Observational Technique."

The research reported herein was performed pursuant to a contract with the United States Department of Health, Education, and Welfare under the provisions of the Cooperative Research Program.

Project Number: 2873

SP001502

PROJECT STAFF

Edmund Amidon	Project Director
Norma Furst	Project Associate
Gertrude Moskowitz	Instructor
Anita Simon	Instructor
Wilford Weber	Graduate Assistant
Thomas Samph	Graduate Assistant
Evan Powell	Graduate Assistant
Marsha Altzman	Project Secretary

Part-time Employees

Robert Bailey
James Brown
Charles Cunningham
Eugene Fleisher
Edward Gehringer
Sheryl Hershinger
Marilyn Hershman
Evelyn Jordan
Josephine Massaro
Sandra Jean Mezey
Robin Nelson
Michael Nise
Emily Oelkers
Donald Robinson
John Rosenberg
Sheryl Sanderow
James Schieb
Robert Shaffer
Ellen Yermanock

PREFACE

The project on student teaching would not have been possible if a number of people had not been willing to spend a great deal of time doing a number of varied jobs. It is not possible to give every single person the credit he or she deserves.

In the initial stage of developing the proposal, John Mickelson, who at that time was chairman of Secondary Education at Temple, was very helpful. At that time Elizabeth Hunter, who later became a consultant on the project, gave valuable help in the formulation of the basic design of the study. Many of the ideas for skill sessions used in the experimental course were hers and the author owes her a real debt for the help she gave throughout the project.

Robert Soar and Ned Flanders also helped as consultant in both research design and development of structure for the experimental course itself.

A study of this nature is particularly difficult to conduct because control of experimental data requires that the identical course be taught for three semesters. I wish to thank the administration of the College, particularly Dean Paul W. Eberman, for help and support in all stages of the study.

Of course the major contributions to this study were those who made up both the research and instructional staff. In nearly all cases the staff members of the study had three jobs, participating in some research function, serving in an instructional capacity, and conducting their own doctoral researches. These staff members were Norma Furst, Research Associate; Gertrude Moskowitz and Anita Simon, Instructors; and Evan Powell and Wilford Weber, Research Assistants. Dr. Furst coordinated both instructional and administrative aspects of the project, while Drs. Simon and Weber worked on the data.

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Dr. Gertrude Moskowitz compiled the skill sessions which are included in the appendix.

I would like to thank Marsha Altzman for her help on the project throughout the thirty month duration of the project.

Edmund J. Amidon

A STUDY OF STUDENT TEACHING

CHAPTER I

Introduction

In the fall semester of 1962-63, a new course, The Teaching-Learning Process, was introduced into the Secondary Education curriculum at Temple University. A year of planning and preparation preceded the introduction of the course. The particular purpose of the course was to develop understandings of the principles of teaching and learning as they apply to classroom methodology. The course met for four hours each week---two hours of lecture on principles of teaching and learning and two hours of laboratory designed to illustrate these principles through experiments in learning and simulations of teaching-learning situations. By mid-semester it seemed apparent to the instructors teaching the course that, in spite of a year's planning and preparation, the course was not meeting the instructors' expectations. This was primarily evidenced in the students' inability to relate the theory they had learned to classroom practice. While the students seemed to have developed some understanding of basic principles of teaching and learning, they were largely unable to apply such principles to their teaching situations at anything more than a superficial level. In addition, students often commented that they could see no highly abstract and nonfunctional. A student evaluation of the course added further support to the instructors' informal evaluations.

To remedy this situation, an experimental course was developed to be tried with one section during the second semester.

The new element introduced in this experimental section was the teaching of Interaction Analysis (Amidon and Flanders, 1963).

The group taking the experimental course was compared with one control group who took the regular lecture and laboratory in the course, The Teaching-Learning Process. The members of the experimental group were found to have more positive attitudes toward teaching, and were rated by their supervisors as more successful in student teaching than the student teachers in the control group. This study is described in detail by Hough and Amidon (1964).

This project has utilized the elements of the pilot study conducted by Hough and Amidon which is described above. In addition, the student teachers were supervised by cooperating teachers whose training included either Interaction Analysis or learning theory.

One of the most serious problems in pre-service teacher education is that of making student teaching supervision more effective. In a recent study, Medley and Mitzel (1964) found that when compared to many other variables which might be related to change in student teacher behavior, the college supervisor had little influence. One of the major problems upon which the present research has focused is that of improving the effectiveness of the cooperating teacher's supervision of the student teacher. This was done by testing the effect on student teacher behavior of systematically training some cooperating teachers in Interaction Analysis.

Background

In an early attempt to use Interaction Analysis with teachers, Flanders instituted an in-service program in which Interaction

Analysis was taught as an observational tool. The in-service program was able to effect observable changes in teacher patterns of verbal behavior. In general, at the end of the experimental in-service program, these teachers evidenced more encouraging and accepting behavior and were less critical and more indirect than they had been at the beginning of the experiment.

In an application of Interaction Analysis to pre-service teacher education, Kirk (1963) conducted a study with student teachers in elementary education in which he taught Interaction Analysis to an experimental group and compared this group with student teachers who had no Interaction Analysis. He found that the experimental group talked less, had more pupil initiated talk and more often accepted pupil ideas than student teachers in the control group. Zahn (1964) found that student teachers who learned Interaction Analysis developed more positive attitudes toward student teaching than did a control group of student teachers who were not taught Interaction Analysis.

There appeared to be enough justification in the research to indicate that Interaction Analysis does have possibilities as a tool for teacher education. The logical place to introduce this tool seemed to be at a point in the training of teachers where patterns of classroom behavior are being formed.

This study was built upon the studies reported above, which seemed to demonstrate that Interaction Analysis could be used fruitfully with student teachers.

Little, if any, systematic research has been done on the training of cooperating teachers to supervise student teachers. However, the recent work of Medley and Mitzel (1964) and Zahn (1964) does suggest that there is a relationship between the behavior and attitudes of cooperating teachers and growth in student teaching. While they found that the effect of the college supervisor on the student teacher was slight, the influence of the cooperating teacher and the classroom situation appeared to be great. For this reason it seemed important to test the effect of training the cooperating teacher.

Problem

The present study was designed as a two and a half year study to test the relationships between the training of cooperating teachers and ceftain course content, and the behavior and attitudes of student teachers. The following hypotheses were tested in order to gain some understanding of this relationship.

1.) Student teachers taught Interaction Analysis were rated by impartial observers as more effective teachers than student teachers not taught Interaction Analysis.

2.) Student teachers taught Interaction Analysis were more indirect at the end of their student teaching experience than student teachers not so taught.

3.) Student teachers taught Interaction Analysis were perceived by their pupils as being more indirect at the end of student teaching than were student teachers not so taught.

4.) Student teachers taught Interaction Analysis had more positive attitudes toward teaching at the completion of student teaching than students not taught Interaction Analysis.

5.) Student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis were rated by impartial observers as more effective teachers than student teachers working with cooperating teachers not trained in Interaction Analysis.

6.) Student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis were more indirect at the end of student teaching than student teachers working with cooperating teachers not trained in Interaction Analysis.

7.) Student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis were perceived by their pupils as more indirect at the end of student teaching than student teachers working with cooperating teachers not trained in Interaction Analysis.

8.) Student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis had more positive attitudes toward the teaching situation than student teachers working with cooperating teachers not trained in Interaction Analysis.

9.) Student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were rated by impartial observers as more effective teachers than student teachers not receiving such training and supervision.

10.) Student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were more indirect at the end of student teaching than student teachers not receiving such training and supervision.

11.) Student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were perceived by their pupils as more indirect at the end of student teaching than were student teachers not receiving such training and supervision.

12.) Student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis had more positive attitudes toward teaching at the completion of student teaching than did student teachers not recieving such training and supervision.

Procedures

There were two independent variables: student teaching course content and the training of the cooperating teacher. The course content for student teachers consisted of either traditional learning theory or Interaction Analysis. The cooperating teacher was trained in the use of Interaction Analysis as an observational technique, or received training in learning theory.

The design made it possible to test the influence of the two independent variables: the training of cooperating teachers and student teaching course content, upon the dependent variables: ratings of student teachers' teaching effectiveness, attitudes of student teachers, pupil perception of student teachers, and student teachers' teaching patterns. The four groups were compared with one another to determine whether student teaching course content or the training of the cooperating teacher or a combination of the two had the most significant influence on the dependent variables.

Students were randomly assigned to treatments so that the effect of sex and socio-economic areas of student teaching assignments were eliminated. An equal number of student teachers in each of the four experimental groups were assigned to schools in culturally deprived and in middle-class neighborhoods. There were roughly equal numbers of male and female student teachers within each of the four experimental groups. In addition, an equal number of men and women student teachers were assigned to each of the designated types of neighborhoods.

Approximately forty student teachers were involved in the experiment during each of three semesters, all of them participating in their second student teaching experience. The student teachers were assigned to experimental groups according to a two by two design. Student teachers were assigned in equal numbers to the four conditions on the basis of socio-economic area in which they student taught and subject matter taught. One of the particular problems in the student teaching assignment at Temple was the large number of placements in the "culturally deprived" area of Philadelphia. By using this type of design an attempt was made to control the influence on the results of "cultural deprivation."

The student teachers were all students in the Department of Secondary Education at Temple University. Nearly all of the students were residents of Philadelphia. Approximately sixty per cent of the student teachers were girls. The four groups were compared on the basis of personality and attitudes in order to determine the influence of these variables.

Student teachers were rated at the end of their student teaching experience by the same measuring instrument which the Department of Secondary Education normally uses to rate student teachers. Student teachers were rated by impartial observers not involved in supervision who did not know which student teachers were in which of the four experimental groups.

Student teaching behavior was assessed by the use of Interaction Analysis. Each student teacher was observed twice at the end of the semester by a trained observer using Interaction Analysis. These observers were not the college supervisors and they did not know which student teachers were in which of the four experimental groups.

The Student Perception of Teacher Influence Scale was used to assess the perception that the children had of their student teacher's behavior. In this the data are gathered on a nine point scale, and can be analyzed statistically. This instrument was used initially by Amidon(1959) and Anderson(1961) with secondary school pupils, and has been adapted for use in the elementary school by Kirk (1964).

The Teaching Situation Reaction Test was used to assess student teacher attitudes. In general this test measures the student teacher's reaction to a classroom situation in terms of the direct-indirect dichotomy. A student teacher with a low score sees himself reacting fairly indirectly to a classroom situation, while a high score indicates a more direct reaction. This test was administered at both the beginning and end of the student teaching experience.

Rokeach's Dogmatism Scale was used to measure personality. A discussion of the test construct and validation procedure is available in Rokeach, The Open and Closed Mind (1960). The aspect of personality measured by the test is the openness or closedness of a person's belief system.

Comparisons were made among the student teacher groups on rating of effectiveness, interaction patterns pupil perception of change, and student teacher attitudes. Student teachers were assigned randomly to a two by two design which made it possible to separate for analysis the effects of the independent variables of student teaching course content and cooperating teachers' training.

The purpose of this first chapter was to introduce the study, give an overview of the objectives, sketch the method for carrying out the study. The second chapter presents a review and analysis of previous research that is relevent to this study. It also attempts to relate this study to the growing body of research being carried out in the area of classroom Interaction Analysis.

BACKGROUND AND RESEARCH

CHAPTER II

Introduction

This chapter attempts to indicate the place of the present study in the total area of research that has been conducted on classroom Interaction Analysis. It presents a theoretical basis for the types of studies which use classroom observational measures and then relates the classroom observational research to teacher education.

Assumptions

Many educators have lost faith in much of what is labeled Educational Research. Very often practioners react to the results of much research with a statement like, "It is fine under ideal conditions; but in my school, or my classroom, you need to be strict or offer structure."

Perhaps this comment indicates the nature of a basic issue of teacher improvement. Research and theory are important, even necessary, but how do the results of educational research apply to the individual?

There is another problem. Suppose we discovered that there is a perfect negative correlation between the amount teachers talk and student achievement. Would teachers reduce the amount they talk? Perhaps, but this study is built on the conclusions of a good deal of previous research which seems to indicate that when research points a direction for teachers to change and the indicated direction of change affects an important part of a teacher's total style of living, the answer to implementation of research is not a simple"let's tell them how to teach."

This study is built on a number of studies which have been conducted using Interaction Analysis. First, there is the early work of

Anderson (1937), Withall (1949) and others who have shown that it is useful to categorize minute segments of classroom verbal behavior. This early research, along with the work of Bales (1951) and Lewin, Lippitt and White (1939), shows clearly that the behavior of an instructional leader does affect children in ways which can be studied and understood.

Flanders, Medley and Mitzel and others who have persistantly worked on the problems of classroom observation are the scholars who have contributed to what may be the most significant educational knowledge thus far uncovered.

What are some of the findings from Interaction Analysis research that makes it such "optimistic research?"*

1. Interaction Analysis has been taught to several thousand teachers. Many of these teachers have stated that it was the one technique they had heard of that helped them solve their everyday teaching problems.

2. Research by Soar (1966), Medley and Mitzel (1964), Bellack (1967) and others seems to paint a picture of the usual classroom that many professional educators recoil from. This is a classroom in which teachers give almost all the information, ask narrow memory-type questions, reward the right answers with one word, and treat discipline problems with criticism. Interaction Analysis has helped us identify specific teacher behaviors that can be modified and thus produce more flexible teaching patterns.

3. The results are not conclusive but there is enough evidence in studies by Amidon (1959), Flanders (1960), Soar (1966) and Furst (1967) to question some of our basic assumptions about the nature of effective teaching. An example of this can be found in Flanders'

*(Writer first heard John Hough make this statement at Temple in 1965.)

early research as well as in Furst's more recent study. Both of these studies seem to show that teachers who respond consistently with the same bahavior in similar situations are less likely to produce high achievement in children than are more flexible teachers. Powell's (1967) and Weber's (1967) studies also support this conclusion.

Tools for the Study of Teaching

One of the basic assumptions upon which this study was built is that teachers must be equipped with tools which they can use to test their own assumptions about their teaching; that is, they must become researchers---in the study of their own teaching!

Several category systems other than Interaction Analysis have been widely used to study teaching. Several reviews of research have shown how the use of these instruments has tended to increase every year over the past ten years. A few examples follow:

In the early 1950's there was only one published category system which was available for teachers' use. This was the Withall climate index (1948). Withall had developed seven categories of teacher behavior, three teacher-centered, three learner-centered and one neutral. These categories have been used consistently for the past ten years in both research and teacher training. Because they were the forerunners of the Interaction Analysis categories they are not described in detail.

In the late 1950's several researchers had begun to develop category systems. Smith (1961) had begun his work on a study of the logic of teaching, Medley and Mitzel (1958) had developed their Observation Schedule and Record (OScAR) and Hughes (1959) had developed her system for analyzing teaching functions. Since 1960, a major area of educational research has been the development of new category systems or observational procedures for the study of teaching. Just for the purpose of illustration---

At the University of Illinois, Aschner and Gallagher (1965) developed a category system based on Gilford's structure of the intellect. This system divided thinking as indicated by classroom talk into four categories: cognitive memory, convergent production, divergent production and evaluation. Since that time Gallagher (1966) has developed a new system which he is currently using. Also at the University of Illinois, Spaulding (1963) refined the system which he had earlier developed at Stanford. This procedure ultimately led Spaulding to work with pre-service teachers at Hofstra University. Two observational systems that were used with special curricular areas were developed by Oliver and Shaver (1963), in social studies, and Wright and Procter (1961), in mathematics. Another system was developed in California by Taba (1964) for use in elementary social studies. Taba's system is unique in that it was developed primarily as a teacher-training tool.

Recently, Perkins (1964) and Bellack (1963) have developed observational instruments that, even though they are similar to earlier systems, show that researchers are not satisfied to use the old instruments, but continue to search for new measuring instruments.

Interaction Analysis Modifications

Perhaps the most interesting development of all has been that which has its roots in Interaction Analysis at Temple University. Although the major research employed at Temple on classroom observation has been Interaction Analysis, no less than five substantial modifications have been developed at Temple or by graduate students who did their work at Temple. In the middle 1960's, Hough (Amidon and Hough, 1967) developed a system that, while it has the basic categories of Interaction Analysis, nevertheless added a group of categories based on learning theory. This category system has since been used in teacher training at the Ohio State University. Another system not published but available in mimeographed form is that developed by Simon (1966). While this system is simple to use, it enables the observer to study the students as well as the teachers. Amidon and Hunter (1966) developed and published the Verbal Interaction Category System (VICS) for teacher training. This system is similar to Flanders', but adds a number of categories for students and eliminates the indirect-direct dichotomy.

Two category systems developed at Temple illustrate what may become a trend, that is, the attempt to develop multidimensional category systems. Amidon's system (Amidon and Hunter, Amidon and Hough, 1967) uses the basic categories of Interaction Analysis but adds the cognitive dimension by incorporating Aschner's and Taba's ideas into the basic ten categories. Even though these dimensions are added, the category system remains relatively simple to use. Honigman (1967) at Temple has been working for five years on a modification of the Flanders system. Starting with the Interaction Analysis categories and observation procedures, Honigman developed a number of revisions and methodological changes in 1963. A more recent system which he is presently using is the Multidimensional Analysis of Classroom Interaction ("MACI"). An apparent outgrowth of the 1963 revsions, this system has been further influenced by the work of Aschner, Bellack, Hughes, Oliver and Shaver, and Spaulding. MACI is one of the more complex but also one of the more interesting attempts to study teaching. Its three-dimensional structure represents a breakdown of the "social-emotional" dimension into two separate dimensions (affective and procedural) plus the addition of a cognitive dimension.

Interaction Analysis Used as a Classroom Observational Tool

Interaction Patterns and Outcome Variables

This section of Chapter II reports results of several studies that used Interaction Analysis as a tool to collect data on teacher-pupil interaction.

Using experimentally created groups, Amidon (Amidon and Flanders, 1961) tested the effects of teaching geometry to eighth grade dependent prone students by indirect teaching methods as against direct teaching methods. Pre and post achievement tests were administered to all of the students. The students in the indirect group achieved significantly more on the post test of geometry achievement than did those students in the direct group.

In a study using interaction analysis data to analyze naturally occuring teacher behavior and to relate it to student achievement, Flanders (1960) found that pupils in classes of teachers identified as indirect achieved more than pupils in classes in which teachers were identified as direct. In addition, the greatest differences in achievement were between pupils of the most indirect teachers and pupils of the most direct teachers. This study was carried out in junior high social studies and mathematics classes. The results of this early study would seem to indicate that generally there is a linear relationship between achievement and teacher influence; that is, it appears from this study that the most indirect teachers produced the highest achievement in children.

Flanders also observed that the indirect teachers varied their behavior more across different classroom activities than did the direct teachers. On the basis of this, Flanders referred to the more indirect teachers as flexible teachers.

Studies by Nelson and LaShier yeided results which support the Flanders results. These two studies were done in different subject areas from Flanders' study. Nelson's (1966) study was conducted with elementary school children learning language arts, while LaShier's (1966) study was conducted in eighth grade biology classes.

Two other studies which were similar to the original Amidon study were conducted by Schantz (1963) and Bidwell (1967). Schantz tested the effects of indirect and direct teaching styles on high and low ability groups of elementary school students. She found that children with high ability exposed to indirect teaching achieved higher on a science test at the end of an experimental unit than did children taught by the direct teacher. The results for the low ability groups were not statistically significant but a trend was present which favored the direct group. Bidwell, in an experimental study comparing indirect to direct teaching in arithmetic found no significant differences between the two teaching styles. There were some interesting trends present, however, In a post test immediately following an experimental unit, the mean arithmetic scores of the direct and indirect groups were nearly identical. In a comparison of mean gain scores from the post achievement test to a delayed achievement test (two weeks after the experiment) the mean gain in achievement for the indirect group was twice that of the direct group. In spite of what appeared to be a large difference, the statistical test applied yielded no significant difference.

Four recent studies analyzed the relationship between teacher influence patterns and certain pupil outcomes. Powell (1967) and Weber (1967) used the same group of elementary school teachers to test the effects of teacher influence on creativity and achievement in reading and arithmetic. The teachers who taught the same group of children for three years were observed and then, on the basis of the observation, were classified as either direct or indirect. Weber found that children who had been with an indirect teacher for three years scored significantly higher on Torrance's Test of Creativity than did children who had been with the direct teacher. Powell found that the indirect teaching produced higher achievement in arithmetic, but there were no significant results obtained in reading.

Furst (1967) was the first researcher to use two category systems (Interaction Analysis and Bellack's Teaching Moves) to test the influence of teacher behavior on pupil achievement. She found that indirect teacher behavior produced higher student scores on an achievement test than did direct teacher behavior. She also found that higher student achievement was related to the extent to which a teacher gave his lecture in short rather than long periods.

Soar (1966) reported an empirical study of the relationships between teaching patterns and pupil growth in reading, arithmetic, and creativity over a two-year period. Soar came up with the following results: (1) the higher the degree of indirect teaching, the higher the growth in creativity; (2) high teacher criticism produced the least growth in creativity; (3) indirect teaching produced greater growth in vocabulary and reading than did direct teaching.

Descriptive Studies

A number of studies have attempted to describe typical teacher-pupil interaction patterns. Furst and Amidon (1962) observed twenty-five classrooms at each of the elementary grades during reading, arithmetic and social studies lessons. They found that first and second grade teachers were more indirect than teachers of the other grades. When only motivating and controlling categories were used in the i/d ratio (this is called the revised i/d ratio), the fifth grade teachers were found to be more indirect.

Giammatteo (1963) observed seventy-two elementary teachers teaching reading. He found that teachers at all grade levels, primary, middle, and upper, were more direct than indirect. He found that teachers in the middle grades as a group were the most direct. He also found that teachers working in upper socio-economic areas had more direct patterns than teachers teaching in lower socio-economic areas. The results of this study support Furst and Amidon's study in that Giammatteo found that the upper grade teachers were the most accepting of student ideas and that the primary grade teachers gave the most directions.

Amidon and Giammatteo (1965) found that three teachers rated by supervisors as superior had teaching patterns that were significantly different from those of a group of one hundred twenty teachers who had been randomly selected and identified as "typical" teachers. The superior teachers accepted and clarified feelings and ideas of students more than did the average group. The superior group also gave fewer directions, criticized less, talked less, and had more student participation than did the average group.

Interaction Analysis and Teacher Education

Interaction Analysis was first taught to teachers with the goal of teacher change by Flanders (1963). Flanders found that teachers who were indirect at the beginning of training changed more during the training program than did teachers who were direct at the beginning of training.

The first project which utilized Interaction Analysis in pre-service teacher education was conducted by Hough and Amidon (1964). They taught Interaction Analysis to one group of student teachers; the other group studied learning theory. They found that college supervisors rated the student teachers who had learned Interaction

Analysis as better than student teachers who had been taught learning theory. They also reported that the student teachers who had been exposed to Interaction Analysis made significant positive gains in their attitudes toward teaching, while there were no significant changes in attitudes in the group that had been taught learning theory.

Kirk (1964), in an experimental study with elementary school student teachers, trained fifteen student teachers in Interaction Analysis. Fifteen additional elementary school student teachers participated in the experiment and served as a control group. Teachers were observed, but instead of learning Interaction Analysis, they participated in a traditional student teaching seminar. Kirk reported that student teachers in the experimental group tended to talk less and give fewer directions, responded to a pupil-initiated question with a question more often, and resisted the tendency, to a greater extent than the control group, to become more direct at the end of student teaching. Kirk also reported that the pupils in the classes of the experimentally trained teachers talked more, initiated more of their own ideas, talked at greater length and talked more spontaneously than did student teachers in the control group. In addition, the pupils' perceptions were that the student teachers in the experimental class became more indirect and talked less as the semester went along, whereas pupils in the classes of the control group did not perceive these changes in their teachers. The elementary school student teachers in Kirk's experimental group became more indirect at some times and more direct at others. As all the student teachers gained experience, Kirk concluded that they became less like the "indirect" and more like the "average" social studies teachers studied by Flanders (1965).

Furst (1965) observed student teachers who had taken a course similar to the course used in the Hough and Amidon study. She was interested in studying the effects of the training in Interaction Analysis on the teaching behaviors of secondary school teachers. Furst used the Verbal Interaction Category System, a modification of Interaction Analysis developed by Amidon and Hunter (1966), to collect behavioral data on the teacher-pupil interaction patterns. In general, she found that student teachers taught Interaction Analysis used more total acceptance of student ideas and behaviors, and less total rejection of student behavior. In addition, the students trained in Interaction Analysis tended to use more than token acknowledgement of pupils' ideas and spent time clarifying and using pupils' ideas. Some of the student teachers in the sample had taken the experimental course prior to student teaching, while some had taken the experimental course concurrently with student teaching. Furst found that the timing of training in Interaction Analysis made a difference in some student teaching behaviors. However, the differences cited above between the experimental and control groups were not affected by the timing of the training in Interaction Analysis.

A study by Romoser (1965) indicated that training for a period of three days in Interaction Analysis could change the attitudes of education students toward "lenient tolerance" as measured by scales developed from the Minnesota Teacher Attitude Inventory and the Psychological Inventory Flexibility Scale.

Zahn (1965) analyzed the effects of training and supervision in Interaction Analysis on the teaching behavior of student teachers and on the attitudes of cooperating teachers. Zahn found that student teachers who were trained in Interaction Analysis and whose supervisors were also trained in Interaction Analysis had significantly more positive attitudes toward student teaching than did their cooperating teachers. These student teachers also had significantly more positive attitudes toward student teaching than did student teachers not trained in Interaction Analysis and not supervised by a supervisor trained in Interaction Analysis. Zahn's findings indicated that training and supervision using Interaction Analysis relate to a positive shift in attitudes during the student teaching experience and help reduce the tendency for the student teacher's attitudes to become more like those of a teacher with attitudes more negative than the student teacher's. Zahn reported that 19 out of 23 in the experimental group changed their teaching attitudes in a positive direction, while only 36 of the 69 student teachers in the remaining groups became more positive.

In an adjunctive study to the present one, Moskowitz (1966) studied the effects of training in Interaction Analysis both on student teachers' and on cooperating teachers' attitudes and cooperating teachers' teaching behaviors. Moskowitz reported that there were no signigicant differences in amount of student and teacher talk in the classrooms of trained, as compared with untrained cooperating teachers, but that there were significant differences in kinds of talk. Trained cooperating teachers used significantly more indirect teacher influence as measured by the revised i/d ratio, the extended indirect area of the matrix, and a ratio consisting of the extended indirect area and the extended direct areas. Also, there were significant relationships between the teaching patterns of student teachers and their cooperating teachers; trained student teachers used significantly more indirect teaching patterns than did their untrained cooperating teachers as measured by the ratio of indirect to direct teacher behaviors and the extended indirect area.

Student teachers whose cooperating teachers were also trained had significantly more positive attitudes toward their cooperating teachers than did student teachers whose cooperating teachers were untrained. The untrained cooperating teachers reported more positive attitudes toward their trained student teachers than did the untrained cooperating teachers toward their untrained student teachers.

Amidon (1966), in presenting findings from a pilot study, reported that student teachers who knew Interaction Analysis talked less in the classroom, were more indirect in their use of motivating and controlling behaviors, were more indirect in their overall interaction patterns, used more extended indirect influence, and accepted pupils' ideas in an extended fashion more than did student teachers not trained in Interaction Analysis. In addition, the trained teachers used fewer behaviors that were teacher focused. Amidon reported that student teachers who were taught Interaction Analysis used significantly less extended criticism and fewer directions than student teachers who were not so trained.

Simon (1966), in an adjunctive study to the present one, compared student teachers trained in Interaction Analysis with those trained in learning theory. Both of these groups of student teachers were observed teaching in two different classes; one they identified as their favored class, and one they identified as their unfavored class. She found only one difference when the student teachers' behavior in favored classes was compared with their behavior in unfavored classes; they used significantly more praise when working with their favored classes.

On the other hand, Simon reports a number of differences in behavior due to the type of training. Teachers trained in Interaction

Analysis used more praise, less criticism, more extended indirect influence than student teachers trained in learning theory. These comparisons were made when student teachers were teaching their favored classes.

The studies by Hough and Amidon (1964), Kirk (1964), Furst (1965), Zahn (1965), Moskowitz (1966), Simon (1966), and Amidon (1966), cast some doubt on the effectiveness of the traditional student teaching experience. These studies indicate that during the student teaching experience, student teachers tend to become more direct in teaching behaviors and more negative in attitudes about teaching and about their pupils.

The research indicates that training in Interaction Analysis does affect the behaviors of student teachers. Several of the studies reviewed in this chapter have tested the effects of training in Interaction Analysis on the behavior of student teachers. Two studies, Zahn's and Moskowitz's, have been concerned with cooperating teachers. This project is designed to study the effects of the simultaneous training of student teachers and cooperating teachers in Interaction Analysis on the behavior of student teachers.

PROCEDURES

CHAPTER III

This study employed a two by two design in order to test the influence of two variables on certain measures of student teacher behavior and attitudes. These training variables (student teacher training and cooperating teacher training) are variables which are often considered to be the most important elements in the teacher education program. The experiment was carried out three successive semesters in order to provide for replication under nearly ideal conditions.

		Cooperating Teacher	
		Supervision is done by a cooperating teacher trained in interaction analysis	Supervision is done by a cooperating teacher trained in learning theory
Course Content	Interaction Analysis & Seminar	Students Group I	Students Group II
	Learning Theory & Seminar	Students Group III	Students Group IV

Figure 1
THE FOUR EXPERIMENTAL GROUPS

Group I

Student teachers in this group were taught interaction analysis in a two hour a week lecture and a two hour a week laboratory. In addition, they participated in a two hour a week seminar with a college faculty member in which they discussed problems they were having in their teaching. The cooperating teacher, using interaction analysis, observed the student teacher formally once a week for thirty to forty minutes, and spent one hour a week discussing the observation with the student teacher.

Group II

Student teachers in this group were taught interaction analysis in a two hour a week lecture and a two hour a week laboratory. In addition, they had a two hour a week seminar with a college staff member in which they discussed problems they were having in their teaching. The cooperating teacher observed the student teacher formally once a week for thirty to forty minutes, and spent one hour a week discussing the observation with the student.

Group III

Student teachers in this group were taught learning theory in a two hour a week lecture and a two hour a week laboratory. In addition, they had a two hour a week seminar with a college staff member in which they discussed problems they were having in their teaching. They were also observed formally for thirty to forty minutes once a week by their cooperating teacher, who spent one hour a week discussing the observation with them. Although the cooperating teacher may have used interaction analysis in his observation, he was instructed not to discuss this tool or any of its terminology with the student teacher under any circumstances.

Group IV

Student teachers were taught learning theory in a two hour a week lecture and a two hour a week laboratory. In addition, they had a two hour a week seminar with a college staff member in which they discussed problems they were having in their teaching. The cooperating teacher observed the student teacher formally once a week for thirty to forty minutes, and spent one hour a week discussing this observation.

A list of student teachers in each of the four groups with their sex, subject, and school is presented in Figure 2.

STUDENT TEACHERS FALL, 1965

Group I IA-IA

Number	Sex	Subject	School
1101	F	English	George Washington
1102	M	Social Studies	George Washington
1103	F	Social Studies	Germantown
1104	F	Social Studies	Camden
1105	M	Social Studies	George Washington
1106	F	English	Beeber
1107	F	Social Studies	Camden
1108	M	English	William Penn
1109	M	Science	Wanamaker
1110	F	Social Studies	Cooke
1111	F	English	William Penn

Group II IA-LT

1201	M	Social Studies	Audenreid
1202	M	Social Studies	George Washington
1203	F	English	Dobbins
1204	F	Social Studies	Wanamaker
1205	F	English	George Washington
1206	M	English	Dobbins
1207	F	English	Gratz
1208	F	Social Studies	Leeds
1209	F	Social Studies	Leeds
1210	F	Social Studies	Germantown

Group III LT-IA

1301	F	English	Wagner
1302	F	English	Wagner
1303	F	English	Northeast
1304	F	Social Studies	Wanamaker
1305	F	English	Wagner
1306	F	English	Northeast
1307	M	Social Studies	Germantown
1308	M	Social Studies	Germantown
1309	F	Social Studies	Camden
1310	F	Social Studies	Audenreid

Group IV LT-LT

1401	F	English	Camden
1402	F	Social Studies	Beeber
1403	F	Social Studies	Leeds
1404	F	English	William Penn
1405	M	Social Studies	Audenreid
1406	M	Social Studies	Roxborough
1407	F	English	West Philadelphia
1408	F	English	Leeds
1409	M	Social Studies	Vaux
1410	F	Social Studies	Germantown

Figure IIa

STUDENT TEACHERS SPRING, 1966

Group I	IA-IA		
Number	Sex	Subject	School
2101	F	Social Studies	Camden
2102	F	Social Studies	Vaux
2103	M	Social Studies	Camden
2104	F	Social Studies	Wagner
2105	M	Social Studies	South Philadelphia
2106	F	English	Germantown
2107	F	Social Studies	Cooke
2108	F	Social Studies	Fels
2109	F	English	Wagner
2110	M	Social Studies	Germantown
2111	F	Social Studies	Germantown
2112	F	Social Studies	Wagner
2113	F	English	Leeds
Group II	IA-LT		
2201	M	English	Vaux
2202	M	Social Studies	Audenreid
2203	F	English	Olney
2204	F	Social Studies	Beeber
2205	F	English	Camden
2206	F	Social Studies	Germantown
2207	F	Social Studies	Germantown
2208	F	English	Mastbaum
2209	M	Social Studies	Roxborough
2210	M	Social Studies	Leeds
2211	M	Social Studies	Audenreid
2212	F	English	Dobbins
2213	F	English	Mastbaum
2214	F	Social Studies	Wanamaker
Group III	LT-IA		
2301	M	Social Studies	Northeast
2302	M	Science	George Washington
2303	M	Social Studies	Northeast
2304	M	English	Vaux
2305	M	Social Studies	Northeast
2306	F	Social Studies	Tilden
2307	M	Social Studies	William Penn
2308	F	English	Wagner
2309	F	Social Studies	George Washington
2310	F	Social Studies	Northeast
2311	M	Social Studies	Camden
2312	M	Social Studies	Wanamaker
2313	F	Social Studies	George Washington
2314	F	Social Studies	Germantown
Group IV	LT-LT		
2401	F	English	Olney
2402	F	English	Olney
2403	M	Science	Wagner
2404	F	English	Vaux
2405	F	English	George Washington
2406	M	Social Studies	George Washington
2407	F	Social Studies	Olney

(Continued)

Group IV	LT-LT		
2408	F	Social Studies	Leeds
2409	M	Social Studies	Germantown
2410	M	Social Studies	Vaux
2411	F	English	Dobbins
2412	F	Social Studies	Vaux
2413	M	Social Studies	Roxborough

Figure IIb

STUDENT TEACHERS FALL, 1966

Group I	IA-IA		
Number	Sex	Subject	School
3101	F	English	Wagner
3102	M	English	Northeast
3103	F	English	Wagner
3104	M	English	South Philadelphia
3105	F	English	Germantown
3106	F	Social Studies	Camden
3107	F	Social Studies	South Philadelphia
3108	F	English	Norhteast
3109	F	Social Studies	Vaux
3110	M	Social Studies	Germantown
3111	M	Social Studies	Camden
3112	M	Science	West Philadelphia
3113	F	Social Studies	William Penn

Group II	IA-LT		
3201	F	Social Studies	Roxborough
3202	F	English	Gratz
3203	F	Social Studies	Leeds
3204	F	English	Olney
3205	F	Social Studies	Leeds
3206	F	Science	Benjamin Franklin
3207	F	English	Mastbaum
3208	M	Social Studies	Audenreid
3209	F	Social Studies	Roxborough
3210	F	English	Olney
3211	F	English	George Washington
3212	M	English	Mastbaum

Group III	LT-IA		
3301	F	English	George Washington
3302	F	Science	Cooke
3303	F	English	William Penn
3304	F	English	Vaux
3305	F	Social Studies	Northeast
3306	F	English	Vaux
3307	F	Social Studies	Northeast
3308	M	Social Studies	Northeast
3309	F	Science	Wanamaker
3310	F	Social Studies	Northeast
3311	F	Social Studies	Cooke

(Continued)

Group IV	LT-LT		
3401	F	English	Germantown
3402	M	Social Studies	Vaux
3403	M	Social Studies	Olney
3404	M	Social Studies	Wanamaker
3405	F	English	Vaux
3406	F	English	Dobbins
3407	F	Social Studies	Germantown
3408	M	Social Studies	Vaux
3409	F	English	Gratz
3410	F	English	Dobbins
3411	F	English	Camden

Figure IIc

Experimental Conditions

There were two different types of courses which identify the experimental groups for the study. Both types of training were used with student teachers and their cooperating teachers on the basis of design which is described in the previous section. The courses which were given to the student teachers were identical to those given to the cooperating teachers except for the length of time. The course given to the student teachers was approximately sixty hours, while the course for the cooperating teachers was forty-five hours. The course description presented is therefore applicable for both groups.

Experimental Courses

The following description of two courses presents the objectives and activities for both Interaction Analysis and learning theory. It also presents the content which is covered as well as the sequence of the material.

Interaction Analysis Course

The Interaction Analysis course was designed in such a fashion as to facilitiate the acquisition of stated behavioral objectives by the students.* The six hour instructional period was subdivided into three two hour sessions each week: (1) One lecture period for the two interaction analysis groups meeting together; (2) One laboratory period for each group separately; (3) One period devoted to problems directly and specifically connected to student teaching experiences for each group separately.

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*(Behavioral objectives were adapted from the work of John Hough at The Ohio State University.)

The following description of the course gives the behavioral objectives, content and a brief summary of the method used for each session of the lecture and laboratory phases of instruction. Specific details of role playing and skill sessions along with sample materials will be found in the Appendix.

Overall Objectives - As a result of their work in Education 61A, students should evidence an understanding of a skill in the performance of (under simulated conditions) selected aspects of the teaching role in the secondary school.

Secondary Objectives - As a result of their work in Education 61A, students should: (1) Evidence an understanding of and skill in the use of the Flanders System of Interaction Analysis; (2) Evidence an understanding of a facility in the application of selected research findings to their performance of the role of the teacher in the classroom; (3) Be able to conduct an action research project in their cl classroom.

Week 1

Lecture | Laboratory

Data collection and overview of project

Week 2 to Week 4

Third Level objectives - As a result of their work in Education 61A students should: (1.1) Be able to associate the verbal behavior categories of the Flanders System of Interaction Analysis with their appropriate code numbers; (1.2) Be able to categorize classroom verbal behavior (using Interaction Analysis categories) at a rate between 17 and 22 categorizations per minute over a ten minute period of time; (1.3) Be able to categorize a minimum of ten minutes of classroom verbal behavior (using Interaction Analysis categories) with a reliability of at least .60; (1.4) Be able to plot an Interaction Analysis matrix of 100 tallies with no more than a 5% error; (1.5) Be able to interpret the meaning of any of the 100 cells of an Interaction Analysis matrix; (1.6) Be able to compute and interpret the meaning of the I/D revised i/d, percentage of teacher talk, percentage of student talk and matrix interpretation.

Week	Lecture	Laboratory
Week 2	Lecture and discussion of educational research, the place of learning theory psychology, philosophy courses, educational psychology, etc. in teacher training culminating in attempts to describe actual specific teaching behaviors (Circular Process Model used as framework). Group left with question: How would you describe what goes on in the classroom?	Discussion of descriptive versus evaluative language. Small group work to build a category system to analyze classroom Interaction. Assignment: use the category system your group built in a classroom to collect data.
Week 3	Lecture and discussion; history of category system approach, purposes, beginnings. Overview of social-emotional systems development and cognitive approach.	Discuss data collected. Can you use your system to describe a classroom situation to people who were not present. Problems of objective analysis and myriad variables.
Week 4	Introduction to Interaction Analysis, two tape recordings of teacher-pupil interaction pla played, student asked to describe behaviors, students "discover" the ten categories for themselves.	Clarification of categories. Intensive tape listening for categorization of behaviors role playing various categories, how many different 2's can we produce, etc.

Lecture	Laboratory
Week 5	
Lecture and discussion, clarification of conceptual framework, the history of social-emotional systems and research, work of H. H. Anderson, Lewin, Lippitt and White.	Further work in categorization, tape listening and producing behaviors.
Week 6	
Building a matrix, demonstrations and buzz groups to build a matrix, matrix interpretation.	Matrix building, tallying (individual work and buzz groups).
Week 7	
Matrix interpretation continued, lecture and discussion.	Classification, small group work in matrix interpretation.
Week 8	
Building educational psychology principles through research, intensive matrix interpretation, teacher 1 and teacher 2. What assumptions did these teachers make about how students best learn new material?	Discussion and clarification of term project assignment (see objectives for Weeks 14 and 15).
Week 9	
Mid-test.	Test results.

Week 10 to Week 13

Lecture objectives	Laboratory objectives
2.1 Be able to describe the procedures, results and implications of research done by H. H. Anderson; Lewin, Lippitt, White; Morris Cogan; Ned Flanders; Hilda Taba; Mary Jane Aschner; Robert Soar; Marie Hughes; Arno Bellack. Role playing, skill sessions, discussion and lecture concerning significant aspects of the work of each of the above.	1,2.1 Using critical cells in the Interaction Analysis matrix, be able to build instructional models which represent the following ideas as expressed in teacher and student behavior: (a) reinforcement of responses, (b) acceptance of responses (c) aversive stimulation, (d) exercise of responses (drills), (e) acceptance of student feeling (f) guided discovery, (g) elicited responses, (h) emitted responses, (i) clarification of responses, (j) corrective feedback (k) encouragement and praise as extrinsic motivators, (l) diagnosis of student level of understanding, (m) cognitive

(Continued)

Lecture objectives	Laboratory objectives
Week 10 to Week 13	
	structuring through information giving. 1, 2.2 Be able to perform micro role playing segments representing the above principles. Method: Micro role playing for each student.
Week 14 to Week 15	
2.2 Be able to select and defend the selection of learning activities and teaching policies as being appropriate means for facilitating learning in terms of stated objectives. 1, 2.3 Given two matrices representing selected principles of instruction or the violation of such principles, be able to select and defend the selection of the matrix which (all other things being equal) represent the lesson in which the greatest student achievement would occur. Discussion, small group work with matrices.	1, 2.4 Be able to plan, teach and evaluate the effectiveness of different teaching behaviors adhering to the following stipulated requirements: (a) Choose either one concept to be taught to the two different student classes in two different ways or two similar concepts to be taught to one class in two different ways. (b) The two lessons should be planned, taught and taped. (c) Hypotheses should be set regarding the effect of the two different approaches. (d) An evaluation procedure to test the effectiveness of the learning by the group to be carried out. (e) The two tapes analyzed using Interaction Analysis. (f) Results in terms of the evaluating procedures and the teaching behavior discussed. Reporting to the group re: results of term project done in student teaching situation.

Learning Theory

The learning theory undergraduate course was designed in such a fashion as to facilitate the acquisition of behavioral objectives by the students. The six hour instructional period was subdivided into three two hour sessions each week: (1) One lecture period for the two learning theory groups meeting together; (2) One lecture period for each group separately; (3) One period devoted to problems directly and specifically connected to the student teaching experience for each group separately.

The following description of the learning theory course gives the behavioral objectives, content and a brief summary of the method used for each session of the lecture and laboratory phases of instruction. Specific details of role playing and skill sessions along with sample materials will be found in the Appendix.

Overall objectives - As a result of their work in Education 61B, students should evidence an understanding of the role of the teacher in interrelating learning theory principle, subject matter content and level of pupil achievement in the selection, execution and evaluation of appropriate methodology. Students should further evidence an understanding of the role of the teacher in action research.

Secondary objectives - As a result of their work in Education 61B, students should: (1) Be able to evidence an understanding of and facility in the application of selected aspects of learning theory to building appropriate methodology; (2) Be able to describe and analyze the verbal behavior of the teacher and students necessary to achieve stated objectives; (3) Be able to conduct an action research project in their classroom.

Third level objectives - (1.1) Be able to define or recognize a definition of at least twenty-five of the following terms:

self-image
feedback
unconditional positive regard
congruence
values
insight
discovery
set
gestalt
indentifiability
positive immediate reinforcement
inhibition
cueing
shaping
exercise

intrinsic motivation
extrinsic motivation
knowledge of results
primacy
recency
levels of thinking
whole-part vs. part-whole
cognitive memory
divergent thinking
transfer
elicited response
emitted response
active involvement
corrective feedback
conditioned response

Week 1 to Week 2

Lecture objectives	Laboratory objectives
3.1 Be able to plan, execute and report on an action research project undertaken in their own classes which include: (a) hypotheses (b) description of procedure (c) description of measuring instruments (d) an analysis of the data (e) results (f) implications.	
Data Collection; overview of project. Overview of learning theory; its place in professional education, what information must we have in order to make sound professional judgments; (Circular Process Model); lecture and discussion.	What assumptions do we hold regarding good teaching, bad teaching? How might we test these assumptions?
How a teacher may do classroom research? Why? What techniques are important? Lecture and discussion.	Research techniques; how to set up testable hypotheses (assignment for class reports during last three weeks of semester).

Week 3

Lecture objectives	Laboratory objectives
1.2 Be able to state objectives in behavioral terms. 3.3 Be able to select and defend the selection of learning activities as being appropriate means for facilitating learning in terms of stated objectives.	
Behavioral objectives; Popham film strip; lecture and discussion.	Writing behavioral objectives; discussion.

Week 4 to Week 15

Lecture objectives	Laboratory objectives
2.1 Be able to translate the following ideas into examples of teacher functions and student behavior in the classroom (a) reinforcement of responses (b) acceptance of responses (c) aversive stimulation (d) exercise of responses (drill) (e) acceptance of student feeling (f) guided discovery (g) elicited responses (h) emitted responses (i) clarification of responses (j) corrective feedback (k) encouragement and praise as extrinsic motivators (l) diagnosis of student level of understanding (m) cognitive structuring through information giving.	

Week 4

Lecture objectives

Early learning theorists; history of learning theory; its transaltion into text materials and classroom practice; lecture and discussion.

Laboratory objectives

Nonsense syllable experiments; students are experimentor and also subject.

Week 5

Lecture objectives

What prinicples were illustrated by laboratory experiments; commonalities of data discussed; students "discover" primacy, recency, identifiability and belongingness; Thorndike discussed.

Laboratory objectives

Rewards and punishments; role playing and discussion.

Weeks 6 to 8

Lecture objectives

Programmed learning; Skinner; lecture, discussion work with materials (Pressey boards, programmed texts, etc.); students build their own programs in subject areas for their classes.

Laboratory objectives

Week 9

Lecture objectives

Mid-term test.

Laboratory objectives

Test results.

Weeks 10 to 13

Lecture objectives

Lecture and discussion; Gestaltists, Lewinian concepts, Bruner; spiral curriculum, discovery.

Laboratory objectives

Be able to plan, teach and evaluate effectiveness of a simulated lesson adhering to the following stipulated requirements: (a) learning theory principle chosen (b) lesson (c) written report covering
(1) what concept were you trying to teach?
(2) what learning theory rule, principle or assumption were you using?
Each student micro-teaches and lessons are criticized.

Weeks 14 to 15

Lecture objectives	Laboratory objectives
Problems of perception (old lady-young lady figures); value differences among socio-economic classes and between age groups.	Report of classroom research.

Cooperating Teachers and Supervision of Student Teachers

Cooperating teachers were randomly assigned to the four experimental groups. They volunteered to participate in the study and met the criteria normally used by the Department of Secondary Education at Temple. A previous study which used a number of these cooperating teachers determined that the four groups did not differ significantly in their attitudes toward teaching or in their predisposition to behave dogmatically (Moskowitz 1967). This study conducted by Moskowitz, also discovered that the cooperating teachers who had learned Interaction Analysis did have different interaction patterns than the cooperating teachers who learned learning theory.

The Temple staff members who participated in the study were assigned an equal proportion of their teaching load in the two experimental courses as is illustrated in Figure III.

	Interaction Analysis		Learning Theory	
Lecture	Instructor A	1 sec	Instructor A	1 sec
Laboratory	Instructor B Instructor C	1 sec 1 sec	Instructor B Instructor C	1 sec 1 sec
Seminar	Instructor B Instructor C	1 sec 1 sec	Instructor B Instructor C	1 sec 1 sec

Figure III
ASSIGNMENT OF STAFF TO COURSE

The role of the college supervisor as seminar leader was consistent in all four groups. The college supervisor summarized, clarified and highlighted the important teaching problems raised by students in the seminar. He did not introduce content, direct discussion toward a particular problem or in any way predetermine seminar topics, but he did encourage the student teachers to apply either Interaction Analysis or learning theory to their discussion of teaching problems, depending upon which experimental group he was working with.

Measuring Instruments Used in Study

Rating of Student Teachers - All student teachers were rated by an impartial observer. The observer did not know what groups the student teachers were trained in and had no knowledge of Interaction Analysis or of the experiment. The same observer rated all the student teachers in each semester, but the observer was a different person each semester.

The observer was oriented to the use of the rating form in a one hour orientation program. The form was used in order to approximate the type of form which is typically used in a student teaching program. An example of items used in this rating form is as follows:

1. This student teacher seems to be:

1	2	3	4	5	6	7	8	9
very well organized								very disorganized

2. This student teachers seems to be:

1	2	3	4	5	6	7	8	9
very competent								very incompetent

The whole form is found in Appendix B.

Interaction Analysis - In the Flanders system only verbal interaction between teachers and pupils is analyzed because of the difficulty in reliably categorizing non-verbal behavior. All teacher-pupil interaction is divided into ten categories, seven of teacher talk, two of student talk, and one of silence or confusion. Reference to the chart on page 38 during the reading of the following section will assist the reader in obtaining the over-all picture of the categories described in this section.

Teacher talk is recorded under one of two major headings: (a) indirect influence, and (b) direct influence. Indirect influence contains four, and direct influence three categories. Included under the classification of indirect teacher influence are those types of teacher statements which increase student freedom to respond. Direct teacher influence refers to statements which restrict responses by students.

A closer look at the categories of indirect influence reveals the exact types of teacher statements included here. Category one, acceptance of feeling, contains teacher statements communicating acceptance by the teacher of both positive and negative student feelings. Statements which judge the "goodness" or appropriateness of pupil behavior comprise Category two. These may be either praise or encouragement. Category three, acceptance of ideas, is made up of teacher statements which reflect, summarize, or clarify student ideas. Teacher questions which require children's response are assigned to Category four.

Categories of direct teacher influence reveal a contrasting type of teacher behavior. Lecture, giving information, and expressing opinion are recorded in Category five, and Category six is used for the teacher's directions to pupils. In Category seven are placed both statements of criticism and those in which the teacher justifies his authority. Such statements are usually designed to change pupil behavior.

Student talk is divided into only two categories--Category eight, which is student talk in response to the teacher, and Category nine, student talk initiated by the student.

CATEGORIES FOR INTERACTION ANALYSIS

TEACHER TALK	INDIRECT INFLUENCE	1.* ACCEPTS FEELING: accepts and clarifies the feeling tone of the students in a non-threatening manner. Feelings may be positive or negative. Predicting or recalling feelings are included.
		2.* PRAISES OR ENCOURAGES: praises or encourages student action or behavior. **Jokes** that release tension, not at the expense of another individual, nodding head or saying "um hm?" or "go on" are included.
		3.* ACCEPTS OR USES IDEAS OF STUDENT: clarifying, building, or developing ideas suggested by a student. As teacher brings more of his own ideas into play, shift to category five.
		4.* ASK QUESTIONS: asking a question about content or procedure with the intent that a student answer.
	DIRECT INFLUENCE	5.* LECTURING: giving facts or opinions about content or procedure; expressing his own ideas, asking rhetorical questions.
		6.* GIVING DIRECTIONS: directions, commands, or orders to which a student is expected to comply.
		7.* CRITIZING OR JUSTIFYING AUTHORITY: statements intended to change student behavior from nonacceptable to acceptable pattern; bawling someone out; stating why the teacher is doing what he is doing; extreme self-reference.
STUDENT TALK		8.* STUDENT TALK-RESPONSE: talk by students in response to teacher. Teacher initiates the contact or solicits student statement.
		9.* STUDENT TALK- INITIATION: talk by students which they initiate. If "calling on" student is only to indicate who may talk next, observer must decide whether student wanted to talk. If he did, use this category.
		10.* SILENCE OR CONFUSION: pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

*There is NO scale implied by these numbers. Each number is classificatory, it designates a particular kind of communication event. To write these numbers down during observation is to enumerate, not to judge a position on a scale.

In the remaining category are recorded periods of silence or confusion. Pauses, short periods of silence, and periods during which the observer cannot determine who is talking are included in this category. Such a category is necessary because it allows the person who is doing the recording to account for every minute of the time spent in systematic observation.

A summary of the ten categories of Interaction Analysis with brief definitions can be found on page 38.

Use of the Interaction Analysis system involves an observer's spending several hours in a classroom observing various kinds of classroom interaction. The most typical procedure for collecting interaction data in research is presented in this section.

The observer enters the classroom and seats himself in a place where his presence will cause the least amount of distraction to the teacher and the class. He then spends from five to ten minutes observing without recording. During this time he is getting oriented to the classroom, acquiring a "feeling" for the total situation. This accomplished, he begins to record. Every three seconds he writes the category number of the teacher or student verbal behavior which he is observing at that moment. These numbers are recorded in sequence in a column. Since the observer writes approximately 20 numbers per minute, at the end of an observational period of 15 or 20 minutes he will have recorded several long columns of numbers. Accuracy of observation and recording is of prime importance, of course, but evenness of tempo is also vital. While the observer is recording the appropriate category numbers he often records marginal notes explaining unusual happenings in the classroom. These are helpful later in interpreting the material gathered.

The observer always notes the type of class activity being observed, since obviously interaction will vary from one activity to another. Whenever the classroom activity changes so that observing is inappropriate, as for example, when there are various groups working around the classroom, when the class members are working at their seats on individual work, or when silent reading is taking place, the observer stops recording. He then draws a line under the recorded numbers, makes a note of the new activity, and begins categorizing again when the total class interaction resumes.

One of the problems in development of classroom observation techniques has been that of providing a means of taking care of the problem of sequence in behavior. The Flanders system of Interaction Analysis provides a procedure for partially dealing with this problem. As the reader will recall, the observer preserves the original sequence of classroom interaction by recording the category numbers in columns. The following example demonstrates an observer's classification of a short period of classroom interaction and then his summary of that date for later analysis.

A social studies lesson begins in a fourth grade. The observer, who has been sitting in the classroom for several minutes in order to gain some idea of the general climate, now starts to record.

Teacher: "Boys and girls, please open your social studies books to page 5.

Observer classifies this as a 6, followed by a 10, because of the period of silence and confusion during which the children find the right page.

Teacher: "Jimmy, we are all waiting for you. Will you please turn to page 5 in your book?

Observer records a 7 and a 6.

Teacher: "I know now that some of you had difficulty with and were a little upset by this chapter yesterday, but I think that today we will find it more exciting and interesting."

Observer records two 1's, reacting to feeling.

Teacher: "Now, has anyone had a chance to think about what we discussed yesterday?"

Observer records a 4.

Student: "I thought about this, and it seems that the reason that we are in so much trouble in southeast Asia is that we haven't really had a chance to learn to understand the ways of the people who live there."

Observer records three 8's.

Teacher: "Good, John. That is a very interesting point which I think we should examine more carefully."

Observer classifies this as a 2.

Thus the following sequence of numbers have been recorded by the observer in this fashion:

10)
(6
10)
(7
6)
(1
1)
(4
8)
(8
8)
(2
10

Notice that in the listing above the numbers have been marked off in over-lapping pairs. The first pair 10-6, the second 6-10, the third 10-7, etc. The numbers are summarized by placement in a 10 row by 10 column table called a matrix. A sample matrix for the interaction pattern just discussed is shown in Figure IV.

The cell in the matrix in which a pair is to be recorded is determined by using the first number in the pair to indicate the row, the second number for the column. Thus the pair 10-6 is shown by a tally in the cell formed by row 10 and column 6; the second pair, 6-10, in the cell formed by row 6 and column 10, etc. Notice that each pair of numbers overlaps with the previous pair;

	1	2	3	4	5	6	7	8	9	10
1	1			1						
2										1
3										
4								1		
5										
6	1									1
7						1				
8		1						11		
9										
10						1	1			

Figure IV
SAMPLE MATRIX

therefore, each number, with the exception of the first and last, is used twice. For this reason a 10 is entered as both the first and last number in the observation, 10 being a logical number for the beginning and ending of each session. Such a procedure permits the total of each column to equal the total of the corresponding row.

The tabulations in the matrix can be checked for accuracy by making certain that there is one less tally in the matrix than there were numbers entered in the observation record itself (N - 1). In this case, because we began with 13 numbers, the total number of tallies in the matrix is 12.

During the three semesters of the study fourteen different observers were used to collect Interaction Analysis data. Weekly reliability sessions were held and Scott (Flanders 1960) Coefficients ranged between .69 and .94. The average reliabilities remained well above .85, a figure suggested by Flanders (1960).

Interaction Analysis Variables - One of the discouraging features of collecting live observational data is the tremendous amount of data to be processed. At least one tally is made every three seconds during the period of observation, and these tallies must be built into a matrix before data analysis can occur. Building the matrices is ordinarily a time consuming process. The computor program used in this project is made up of several sub-programs. The first sub-program, written took raw tallies which were punched onto IBM cards and produced as output two individual teachers; matrices for each set of tallies put in. One matrix was a raw tally matrix such as would ordinarily be constructed if the matrices were built by hand. The second matrix was a percentage matrix. The value inside each cell indicates the percentage of the total matrix which is represented in the specific cell. In like manner, the row and total columns are given as percentages.

The second part of the program drew out variables from the matrix to be further analyzed.

Once the raw tallies were fed into the computor, along with the program, two completed matrices plus 40 variables for each teacher were produced without any further hand calculation.

On the basis of previous research, a number of important cells were isolated for analysis. For example, Flanders had discovered that a buildup in the 3-3 cell was highly related to pupil achievement. Therefore, this cell was isolated for examination. Some other examples of variables programmed are column totals, amount of teacher and student talk, various indirect-direct ratios, and certain key cells and areas in the matrix. A complete listing of the variables is given at the end of this section.

An additional program was developed to produce group data from the individual data which was yielded by the first program. This program produced an Averaged Group Matrix by summing the percentages in each cell, column, and row of the individual teachers matrix and dividing each sum by the number of teachers in the group. This program also gave an Average Score for the group on each of the variables produced by the original program. Thus the Averaged Group Matrix of two groups of subjects can be easily inspected for differences.

In summary, the first sub-program, built a matrix from raw tallies and converted the raw tally matrix into a percentage matrix. The next sub-program computed and listed those elements of the matrix that the researcher wants to examine intensively. The third sub-program produced a matrix which contains in its cells, rows, and columns, the average percentages for the group being studied. Thus if there were ten teachers in a group, the Averaged Group Matrix would contain the average of the sums of the quantities on each of the teacher's individual matrices. This third sub-program can be used to compile the matrices of any number of teachers into one representative matrix. The last sub-program computed and listed those elements of this Averaged Group Matrix which the researcher wished to examine. These elements are the same as those which were computed for each individual teacher.

An example of an Averaged Group Matrix, plus the variables computed from this matrix are shown below.

Problems of Data Processing - Many of the variables analyzed in this project were represented in the form of ratios. An example is the ratio of indirect-to-direct teacher talk, called the I/D ratio. However, the programming of these ratios causes special problems which are discussed in this section.

Consider the I/D ratio. When a teacher uses no direct talk, a zero will appear in the denominator of this ratio. This results in an undefined term which the computor will not process. Therefore, particular care must be taken when programming ratios. Several alternatives present themselves. 1) An "IF" statement can be written into the program so that the computor will merely print out the direct and indirect scores of teachers who have zero direct scores. The original program for this project was built in this manner. Later it was found that this solution produces many additional problems in data analysis caused primarily by the fact that some teachers have an I/D score and others have a separate direct and indirect score, but no I/D score. Therefore, further data analysis cannot easily be performed for any ratios which are handled in this manner. 2) To allow the use of data derived from scores of teachers who had zero denominators in any ratios, a .9 was arbitrarily plugged into the denominator of any ratio which otherwise would have been zero. This allowed for the use of the ratio score of that teacher in the data. Dividing the numerator by .9 allows for the maintaining of the rank order of scores since an I/D ratio with a denominator of .9 is larger than one with a denominator of 1.0 (assuming the same numerator in both cases). 3) A potentially more useful solution was suggested by Flanders who has constructed an I/D ratio which can never have a zero denominator. The new ratio uses the indirect categories for the numerator and the sum of the indirect and direct categories for the denominator. Thus, for example, the I/D ratio used in this program has been replaced in the revised program with $\frac{I}{I+D}$. All ratios have been handled in a similar manner in the revised program. This solution has the additional advantage of reducing the large variance caused by working with fractions (ratios) which have very small denominators. This becomes important when potentially statistically significant levels of differences between groups are not reached because of statistically artificially produced large variances. In addition, since the training of student teachers in the Flanders System did produce genuinely large variance within the trained groups, these new ratios are particularly useful and have been built into the new program.

A number of measures from the matrix were used to test the hypohteses. A list of those indicies which were used for the data analysis follows.

Student Teacher Rating by Pupils - The Student Perception of Teacher Influence Scale was used to assess the perception that pupils had of their student teachers. The items on the scale are drawn from the teacher behavior categories in the Interaction Analysis system. In this sense the scale is assumed to have content validity. Previous to this study, the instrument was used with Junior High School students by Amidon (1959) and Anderson (1961). Both of these studies contain data which indicates the validity of the instrument in terms of the relationship of Student Perception Scores to data collected using the Interaction Analysis instrument. The instrument has also been used to assess Pupil Perception of Student Teachers in the elementary grades (Kirk 1964). Examples of types of items used are the following:

PUPIL OPINION QUESTIONNAIRE

The questions below are about your student teacher. Please put a check mark in front of the sentence which seems to fit your student teacher best. Please check only one space for each question. No one, not even your student teacher, will ever see your answers so you can be completely honest without having to worry about the information being passed on.

1. The teacher seems to be mostly concerned with

_____talking about the lesson.
_____finding out what we know.
_____telling us what to do.
_____finding out what we want to do.

EXAMPLE OF PERCENTAGE MATRIX FOR A GROUP OF TEN TEACHERS

.03	0.00	.00	.02	.07	.01	0.00	0.00	.04	0.00	.17
0.00	.29	1.44	.84	.89	.16	.05	1.86	1.37	.17	7.08
.01	1.25	1.53	1.78	1.89	.16	.14	.27	.51	.26	7.80
0.00	.65	.13	3.23	.92	.54	.15	5.56	2.02	.96	14.16
.05	1.00	.32	3.63	16.36	.92	.53	.41	1.51	1.31	26.04
0.00	.10	0.00	.72	.72	.65	.11	.85	.22	.70	4.07
.01	.08	.05	.17	.49	.20	.33	.14	.31	.39	2.17
.03	1.97	2.89	1.50	1.47	.43	.19	3.72	.45	.67	13.32
.04	1.44	1.36	1.12	2.14	.24	.31	.08	7.24	1.81	15.77
0.00	.29	.10	1.16	1.08	.75	.36	.43	2.10	3.15	9.42
.17	7.08	7.80	14. 16	26.04	4.07	2.17	13.32	15.77	9.42	

EXAMPLE OF LISTING OF VARIABLES

VARIABLE NUMBER	CODE NAME*	AMOUNT
102	ST	29.10
103	TT	61.48
104	RID	2.40
105	BID	.90
106	RID8	7.88
107	BID8	3.05
108	RID9	5.16
109	BID9	1.47
110	RID89	6.60
111	BID89	2.16
112	XIN	4.55
113	XDI	1.29
114	XINDI	3.52
115	CRUX	24.14
116	CROSS	56.26
122	ZRIDS	.65
123	ZBIDS	.48
125	CRL67	2.38
126	SS17	22.42
127	SS89	10.96
128	SS19	33.38
129	COL 1	.17
130	COL 2	7.06

Variable Number	Code Name	**Interpretation	
NVAR 104 (Revised Indirect-Direct Ratio)	RID =	$\frac{\text{Cols. } 1+2+3 \quad \text{(Indirect)}}{\text{Cols. } 6+7 \quad \text{(Direct)}}$	
	*RID =	$\frac{\text{Cols. } 1+2+3}{\text{Cols. } 1+2+3+6+7}$	
NVAR 105 (Big Indirect-Direct Ratio)	BID =	$\frac{\text{Cols. } 1+2+3+4}{\text{Cols. } 5+6+7}$	
	*BID =	$\frac{\text{Cols. } 1+2+3+4}{\text{Cols. } 1+2+3+4+5+6+7}$	
NVAR 106	RID8 =	$\frac{\text{Cols. } 1+2+3}{\text{Cols. } 6+7}$	(For Row 8 only)
	*RID8 =	$\frac{\text{Cols. } 1+2+3}{\text{Cols. } 1+2+3+6+7}$	(For Row 8 only)
NVAR 107	BID8 =	$\frac{\text{Cols. } 1+2+3+4}{\text{Cols. } 5+6+7}$	(For Row 8 only)
	*BID8 =	$\frac{\text{Cols. } 1+2+3+4}{\text{Cols. } 1+2+3+4+5+6+7}$	(For Row 8 only)
NVAR 108	RID9 =	$\frac{\text{Cols. } 1+2+3}{\text{Cols. } 6+7}$	(For Row 9 only)
	*RID9 =	$\frac{\text{Cols. } 1+2+3}{\text{Cols. } 1+2+3+6+7}$	(For Row 9 only)
NVAR 109	BID9 =	$\frac{\text{Cols. } 1+2+3+4}{\text{Cols. } 5+6+7}$	(For Row 9 only)
	*BID9 =	$\frac{\text{Cols. } 1+2+3+4}{\text{Cols. } 1+2+3+4+5+6+7}$	(For Row 9 only)
NVAR 110	RID89 =	$\frac{\text{Cols. } 1+2+3}{\text{Cols. } 6+7}$	(For Sum of Rows 8 plus 9)
	*RID89 =	$\frac{\text{Cols. } 1+2+3}{\text{Cols. } 1+2+3+6+7}$	(For Sum of Rows 8 plus 9)
NVAR 111	BID89 =	$\frac{\text{Cols. } 1+2+3+4}{\text{Cols. } 5+6+7}$	(For Sum of Rows 8 plus 9)
	*BID =	$\frac{\text{Cols. } 1+2+3+4}{\text{Cols. } 1+2+3+4+5+6+7}$	(For Sum of Rows 8 plus 9)

* These are the revised ratios used in the revised I. A. Measures Program.

** All cells, columns and rows refer to a "percentage matrix" and not to a "raw tally matrix."

Variable Number	Code Number		**Interpretation
NVAR 112 (Extended Indirect Area)	XIN	=	Cells 1-1+1-2+1-3+2-1+2-2+2-3+3-1+3-2+3-3
NVAR 113 (Extended Direct Area)	XDI	=	Cells 6-6+6-7+7-6+7-7
NVAR 114	XINDI	=	$\frac{\text{XIN (NVAR 112)}}{\text{XDI (NVAR 113)}}$
NVAR 122	ZRIDS	=	$\frac{\text{RID9 (NVAR 108)}}{\text{RID8 (NVAR 106)}}$
NVAR 123	ZBIDS	=	$\frac{\text{BID9 (NVAR 109)}}{\text{BID8 (NVAR 107)}}$
NVAR 125	CRL67	=	XDI (NVAR 113) plus Cells 6-10+7-10
NVAR 129	COL1	=	Total Column One
NVAR 130	COL2	=	Total Column Two
NVAR 131	COL3	=	Total Column Three
NVAR 134	COL6	=	Total Column Six
NVAR 135	COL7	=	Total Column Seven
NVAR 137	COL9	=	Total Column Nine
NVAR 139	C33	=	Cell 3-3
NVAR 142 (Extended 3-3 Cell)	EX33	=	$\frac{\text{Cell 3-3}}{\text{Total of Row 3}}$

For the following questions, please put a circle around the number that best tells how you think about your teacher.

1. Does your teacher talk more than the class does?

1	2	3	4	5	6	7	8	9
a lot more				about the same				less than the students

Student Teacher Attitude - The Teaching Situation Reaction Test was used to assess student teachers' attitudes toward their classes. The test generally measures attitudes along the direct indirect dichotomy. A student teacher with a low score sees himself as fairly indirect while a student teacher with a high score sees himself as being direct. Hough and Amidon (1964) have presented data on the validity of an early form of the instrument while Hough and Duncan (1965) presented evidence concerning validity of a revision of the test. This revision was used in this study. An example of an item used is as follows:

Directions: The case example that follows has been planned to measure your ability to work through some of the problems of handling a classroom group. You will be given certain information about the classroom group and the working situation. You will then be asked to respond to a number of questions. This will be repeated through a series of problem situations. The case study has been designed so that you can respond regardless of your teaching subject field. You do not need technical subject matter knowledge to take this test.

You are asked to indicate your first, second, third, and fourth choice under each question by inserting respectively the numbers 1, 2, 3, 4 in the spaces provided on the answer sheets under (a) (b) (c) and (d). The most desirable choice could be labeled 1 and least desirable 4. For example if your first choice was response (c), your second choice was response (a), your third choice was response (b), and your fourth choice was response (d), you would record your responses on the answer sheet as follows:

(a)	(b)	(c)	(d)
2	3	1	4

The Situation:

You have been employed by a school system which is engaged in a series of experimental studies. One of these studies involves an experimental class designed to improve pupils' general adjustment to their environment. A heterogeneous group (physically, mentally, socially) of twenty-five thirteen to fourteen year old youngsters have signed up for this class entitled "Teen Topics" because they thought that it would be interesting.

The class is scheduled to meet the last period of the day on Tuesday and Thursday during the second semester. Arrangements have been made so that the class might take trips and students might have an opportunity to meet informally with the teacher after class.

Around the first of November your principal calls you in to tell you that, if you are interested, you have been chosen to teach the experimental class. You were chosen because of your background in adolescent psychology and your interest in helping youngsters with minor problems of adjustment typical of the young adolescent. You believe that the most efficient learner is the student who is relatively free from personal problems and thus can direct his attention to conventional school learning and uninhibited by his personal concerns. You agree to take the class and believe that by being informed of your new teaching responsibility this early in the year that you will have adequate time to plan for the course.

Your principal has given you pretty much of a "Free Hand" to develop the content of the course and the activities in which the students will be engaged. A good supply of instructional materials (e.g., books on the adolescent and descriptions of similar programs in other schools) has been made available to you. There will be no direct supervision of your work, but an evaluation by students and yourself will be requested at the middle and close of the semester. Studies will also be made of the gain in personal adjustment evidenced by a selected number of your students. You do know the names of the students who have signed up for your course, but you do not know which students in the class have been chosen to be studied and will not know until the end of the semester. An experienced teacher-counselor has been asked by the principal to help you when and if you ask for help. The teacher-counselor knows each of the youngsters you have signed up for your class.

The Group:

Some of the youngsters who have signed up for the course know each other very well, having gone through school together. Three do not know anyone else in the group. Others are only casually acquainted. Members of the group have a variety of interests and abilities, and they represent many levels of competence and come from a variety of socio-economic backgrounds. The quality of their personality adjustment varies, but none is seriously maladjusted.

1. Of the things you would do the evening before meeting the class, the most essential would be to:

   (a) become familiar with the notes for such presentation as you might make

   (b) become familiar with students' names and any information you have about them from their files

(c) become familiar with the sequence and nature of any activities you may have planned

(d) be sure any materials you were to use were available and in good condition.

2. Your greatest concern on this night before the first meeting would be:

(a) how to appear poised and at ease

(b) how to gain control of the group

(c) how to handle problem pupils

(d) how to get your program moving repidly and well

On meeting the group the first day a number of students come in from three to five minutes late. Following this, as you get your program underway the students get restless.

3. With the students that come in late you would:

(a) simply acknowledge their presence and noticeably mark them present in the record book

(b) inform them politely about the time at which the class starts

(c) ask them politely why they were unable to get to class on time

(d) make clear to the class as a whole and the late students in particular the standards you will maintain with regard to tardiness

4. You would handle the restlessness of the group by:

(a) presenting your program more dynamically

(b) asking students why they were restless

(c) speaking to the group firmly about paying attention

(d) picking out one or two of the worst offenders and reprimanding them

Student Teacher Personality - Rocheach's Dogmatism Scale was used to assess student teacher personality. A discussion of the test construct and validation procedure are available in The Open and Closed Mind (1960). The aspect of personality measured by the test is the openness or closedness of a person's belief system. An example of items are presented below:

The following is a study of what students think and feel about a number of important social and personal questions. This is not an intelligence test nor an information test. There are no right or wrong answers. The best answer is your personal opinion. We have tried to cover many different and opposing points of view; you may find yourself agreeing strongly with some statements, disagreeing just as strongly with others, and perhaps rather uncertain on others; whether you agree or disagree with any statement, you can be sure that many people feel the same as you.

Respond to each statement by placing your response in the appropriate place on the answer sheet. Respond by writing +1, +2, +3, or -1, -2, -3 depending on how you feel in each case.

+1 I agree a little	-1 I disagree a little
+2 I agree on the whole	-2 I disagree on the whole
+3 I agree very much	-3 I disagree very much

1. It is only natural that a person would have a much better acquaintance with ideas he believes in than with ideas he opposes.

2. Fundamentally, the world we live in is a pretty lonesome place.

3. Most people just don't give a "damn" for others.

4. I'd like it if I could find someone who would tell me how to so solve my personal problems.

Analysis of the Data

Comparisons were made among the student teacher groups on rating of effectiveness, interaction patterns, pupil perception of teacher behavior and student teacher attitudes. A two by two randomized design made it possible to separate for analysis the effects of the independent variables of student teaching course content and cooperating teachers' training. The two additional variables of sex of the student teachers and neighborhood in which the student teaching occurs were controlled by assigning equal members in the appropriate categories in each group. Each of the experimental groups had an equal number of student teachers placed in schools in culturally deprived neighborhoods and schools in middle-class neighborhoods, and each of the groups had the same proportion of men and women. Analysis of Variance was used to make the comparison among groups, and thus test all hypotheses.

Summary

Chapter III has presented the basic design of the study, a description of the experimental courses and a description of instruments used in the study.

The hypotheses of the study were all tested by comparing combinations of the four groups with one another, specifically hypotheses one through twelve were tested as follows:

In order to test Hypothesis 1, that student teachers who were taught Interaction Analysis were evaluated by impartial raters as more effective teachers than student teachers not taught Interaction Analysis, Groups I and II were compared to Groups III and IV. The student teachers in these two groups were compared according to these impartial ratings.

Hypothesis 2, that student teachers taught Interaction Analysis were more indirect at the end of their student teaching experience than student teachers not so taught, was tested by comparing Groups I and II with Groups III and IV. In this test, the groups were compared on the ratios of indirect to direct teacher influence, recorded by a trained classroom observer using Interaction Analysis.

Hypothesis 3, that student teachers taught Interaction Analysis were perceived by their pupils as more indirect at the end of student teaching than were student teachers not so taught was tested by comparing Groups I and II with Groups III and IV, using the Student Perception of Teacher Influence Scale.

Hypothesis 4, that student teachers taught Interaction Analysis had more positive attitudes toward teaching at the completion of student teaching than students not taught Interaction Analysis, was tested by comparing Groups I and II with Groups III and IV, using the Teaching Situation Reaction Test.

Hypothesis 5, that student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis were rated by impartial observers as more effective teachers than student teachers working with cooperating teachers not trained in Interaction Analysis, was tested by comparing the ratings of Groups I and III with Groups II and IV.

Hypothesis 6, that student teachers working with those cooperating teachers who had been trained in Interaction Analysis were more indirect at the end of student teaching than student teachers working with cooperating teachers not trained in Interaction Analysis, was tested by comparing Groups I and III with Groups II and IV, using Interaction Analysis data. The prediction was made that student teachers in Groups I and III would be more indirect at the end of the experiment than the student teachers in Groups II and IV.

Hypothesis 7, that student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis were perceived by their pupils to be more indirect at the end of student teaching than student teachers working with cooperating teachers not trained in Interaction Analysis, was tested by comparing Groups I and III with Groups II and IV. The instrument used was the Student Perception of Teacher Influence Scale.

Hypothesis 8, that student teachers working with those cooperating teachers who had been trained in Interaction Analysis had more positive attitudes toward the teaching situation than student teachers working with cooperating teachers not trained in Interaction Analysis, was tested by comparing Groups I and III with Groups II and IV. The instrument used to assess student teacher attitudes was the Teaching Situation Reaction Test.

Hypothesis 9, that student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were rated by impartial observers as more effective teachers than student teachers not receiving such training and supervision, was tested by comparing Group I with the other three groups according to the ratings of the impartial observers.

Hypothesis 10, that student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were more indirect at the end of student teaching than student teachers not receiving such training and supervision, was tested by comparing Group I with the other three groups, using Interaction Analysis.

Hypothesis 11, that student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were perceived by their pupils as more indirect at the end of student teaching than student teachers not receiving such training and supervision, was tested by comparing Group I with the other three groups. The instrument used was the Student Perception of Teacher Influence Scale.

Hypothesis 12, that student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis had more positive attitudes toward teaching at the completion of student teaching than did student teachers not receiving such training and supervision, was tested by comparing Group I with the other three groups. The instrument used to assess student teaching attitudes was the Teaching Situation Reaction Test.

The next chapter presents the data used to test the twelve hypotheses.

RESULTS OF TESTING THE HYPOTHESES

CHAPTER IV

Chapter IV presents the hypotheses and the data used to test the hypotheses. The hypotheses are presented in groups of three since each of the dependent variables were included in three separate hypotheses. Also because the Analysis of Variance tests two main effects and the interaction effect simultaneously, the appropriate procedure is to present the hypotheses in groups of three.

The first, fifth and ninth hypotheses were tested by doing an Analysis of Variance comparing student teachers in the four groups on the ratings of an impartial observer. The hypotheses were as follows:

1.) Student teachers who were taught Interaction Analysis were rated by impartial observers as more effective teachers than student teachers not taught Interaction Analysis.

5.) Student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis were rated by impartial observers as more effective teachers than student teachers working with cooperating teachers not trained in Interaction Analysis.

9.) Student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were rated by impartial observers as more effective teachers than student teachers not receiving such training and supervision.

The data are at best conflicting. In the first semester, the Analysis of Variance supports the first hypothesis, that is the student teachers in the Interaction Analysis group received significantly better ratings than those with learning theory. (The lower score is a better rating.) Hypothesis five is not supported in the first semester in fact the .05 difference is in the opposite direction. Hypothesis nine, is also not supported since group I (Interaction Analysis - Interaction Analysis) did not have the lowest mean, and there is no significant interaction effect indicated in the Analysis of Variance.

In the next two semesters there are no significant differences found in any of the analyses. However, in the second semester data, ten points separate the means of the student teacher supervised by learning theory trained teachers and Interaction Analysis trained teachers. This difference however is not in the predicted direction (See Tables 1, 2 and 3).

The tests of the second, sixth and tenth hypotheses are more complex. They are as follows:

2.) Student teachers taught Interaction Analysis were more indirect at the end of their student teaching experience than student teachers not so taught.

6.) Student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis were more indirect at the end of student teaching than student teachers working with coopcrating teachers not trained in Interaction Analysis.

10.) Student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were more indirect at the end of student teaching than student teachers not receiving such training and supervision.

There are a number of indecies of directness or indirectness. The tests for these hypotheses are presented in several different analyses. The first group are the comparison of the various Indirect-Direct indecies. The first of these is the revised i/d ratio, which is a measure of the indirectness or directness of the motivating and

Table 1

RATING OF IMPARTIAL OBSERVER

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	2240.45	1	2240.45	4.60*
C. T. Training	2177.78	1	2177.78	4.47*
Interaction	121.00	1	121.00	———
Error	15547.33	32	486.85	
Total	20086.56	35		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	57.11	9	38.89	18	48.00
	LT	9	69.22	9	58.33	18	63.78
	Total	18	63.17	18	48.61	36	55.89

Table 2

RATING OF IMPARTIAL OBSERVER

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T Training	05.31	1	05.31	1.63
C. T. Training	94.23	1	94.23	——
Interaction	22.23	1	22.23	——
Error	9017.92	48	187.88	
Total	8596.15	51		

*p 05.
**p .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	61.54	13	58.54	26	60.04
	LT	13	65.08	13	63.69	26	64.39
	Total	26	63.31	26	61.12	52	62.22

Table 3

RATING OF IMPARTIAL OBSERVER

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	68.40	1	68.40	——
C. T. Training	1471.62	1	1471.62	3.53
Interaction	1084.71	1	1084.71	2.60
Error	16246.05	39	416.57	
Total	18870.78	42		

*p - .05.
**p .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	66.85	11	65.18	24	66.08
	LT	9	74.44	10	52.50	19	62.42
	Total	22	69.55	21	59.14	43	64.47

controlling behaviors the teacher uses. The first two semesters there were no differences among the group on this variable. The third semester, however, the student teachers trained in Interaction Analysis had significantly higher revised i/d ratios than the student teachers trained in learning theory. While this tends to support hypothesis two, there is no support for hypotheses six or ten (See Tables 4, 5 and 6).

The second variable used as a test of the three hypotheses was the I/D ratio. In this test, the results were mixed for the first two semesters. The comparison of data in the third semester however produced a difference that was significant at the .05 level and approached the .01 level. Again this supports hypothesis one, but there is no support for the other two hypotheses(See Tables 7, 8 and 9).

The next measure of Indirect-Direct teaching is the i/d ratio for row eight. Although hypotheses six and ten are not supported by these analyses in any of the three semesters, hypothesis two is supported in the third semester ($P > 05$). The difference indicates that the Interaction Analysis group is significantly more indirect. In the first semester the differences are in the predicted direction, but significant only at the .10 level (See Tables 10, 11 and 12).

The next variable was I/D ratio for row eight. Again as in the previous tests, the only .05 significant difference was for the third semester and between types of student teacher training. However, the first semester difference was in the predicted direction. Hypothesis two was the only one supported in this test (See Tables 13, 14 and 15).

The revised i/d ratio row nine was a variable which when analyzed produced significant differences for both first and third semester

Table 4

i/d RATIO

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.26	1	0.26	1.37
C. T. Training	0.02	1	0.02	——
Interaction	0.01	1	0.01	——
Error	6.09	32	0.19	
Total	6.38	35		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.77	9	0.78	18	0.78
	LT	9	0.57	9	0.65	18	0.61
	Total	18	0.67	18	0.72	36	0.69

Table 5

i/d RATIO

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.00	1	0.00	——
C. T. Training	0.02	1	0.02	——
Interaction	0.01	1	0.01	——
Error	6.50	48	0.14	
Total	6.53	51		

$^{*}p < .05$.
$^{**}p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.72	13	0.66	26	0.69
	LT	13	0.69	13	0.67	26	0.68
	Total	26	0.70	26	0.66	52	0.68

Table 6

i/d RATIO

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.17	1	0.17	4.25*
C. T. Training	0.01	1	0.01	——
Interaction	0.01	1	0.01	——
Error	1.47	39	0.04	
Total	1.66	42		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.81	11	0.80	24	0.81
	LT	9	0.71	10	0.65	19	0.68
	Total	22	0.77	21	0.73	43	0.75

Table 7

I/D RATIO

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.02	1	0.02	——
C. T. Training	0.12	1	0.12	4.00
Interaction	0.03	1	0.03	1.00
Error	1.07	32	0.03	
Total	1.24	35		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.45	9	0.52	18	0.48
	LT	9	0.35	9	0.51	18	0.43
	Total	18	0.40	18	0.52	36	0.46

Table 8

I/D RATIO

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.00	1	0.00	___
C. T. Training	0.01	1	0.01	___
Interaction	0.00	1	0.00	___
Error	0.83	48	0.02	
Total	0.84	51		

$^*p < .05$.
$^{**}p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.41	13	0.43	26	0.42
	LT	13	0.42	13	0.46	26	0.44
	Total	26	0.42	26	0.44	52	0.43

Table 9

I/D RATIO

Third Semester

Analysis of Variance

Source of Variance	SS	df	MS	F
S. T. Training	0.13	1	0.13	6.50*
C. T. Training	0.03	1	0.03	1.50
Interaction	0.09	1	0.09	4.50*
Error	0.76	39	0.02	
Total	1.01	42		

$^{*}p < .05$.
$^{**}p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.39	11	0.53	24	0.45
	LT	9	0.37	10	0.33	19	0.35
	Total	22	0.38	21	0.43	43	0.41

Table 10

i/d RATIO ROW 8

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.13	1	0.13	3.25
C. T. Training	0.01	1	0.01	___
Interaction	0.06	1	0.06	1.50
Error	1.19	32	0.04	
Total	1.39	35		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.92	9	0.89	18	0.90
	LT	9	0.73	9	0.84	18	0.78
	Total	18	0.82	18	0.86	36	0.84

Table 11

i/d RATIO ROW 8

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.04	1	0.04	1.33
C. T. Training	0.01	1	0.01	___
Interaction	0.00	1	0.00	___
Error	1.28	48	0.03	
Total	1.33	51		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.90	13	0.88	26	0.89
	LT	13	0.85	13	0.81	26	0.83
	Total	26	0.88	26	0.84	52	0.86

Table 12

i/d RATIO ROW 8

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.05	1	0.05	5.00*
C. T. Training	0.02	1	0.02	2.00
Interaction	0.04	1	0.04	4.00
Error	0.46	39	0.01	
Total	0.57	42		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.94	11	0.96	24	0.95
	LT	9	0.93	10	0.83	19	0.88
	Total	22	0.93	21	0.90	43	0.92

Table 13

I/D RATIO 8

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.12	1	0.12	1.09
C. T. Training	0.01	1	0.01	——
Interaction	0.08	1	0.08	——
Error	3.55	32	0.11	
Total	3.76	35		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.89	9	0.83	18	0.86
	LT	9	0.68	9	0.81	18	0.74
	Total	18	0.78	18	0.82	36	0.80

Table 14

I/D RATIO ROW 8

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.00	1	0.00	—
C. T. Training	0.02	1	0.02	—
Interaction	0.00	1	0.00	—
Error	1.35	48	0.03	
Total	1.37	51		

$^{*}p < .05$.
$^{**}p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.79	13	0.75	26	0.77
	LT	13	0.80	13	0.76	26	0.78
	Total	26	0.80	26	0.76	52	0.78

Table 15

I/D Ratio Row 8

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.11	1	0.11	5.50*
C. T. Training	0.00	1	0.00	——
Interaction	0.04	1	0.04	——
Error	0.59	39	0.02	
Total	0.74	42		

*p ≤ .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.80	11	0.87	24	0.83
	LT	9	0.76	10	0.71	19	0.73
	Total	22	0.79	21	0.79	43	0.79

between the student teachers who learned Interaction Analysis and those who were exposed to learning theory. Again this supports the second hypothesis but not the other two (See Tables 16, 17 and 18).

The I/D ratio row nine when analyzed included one large difference for the third semester which supported hypothesis two. There was also a trend in the first semester analysis which was in the predicted direction. Again these data do not support either of the other two hypotheses (See Tables 19, 20 and 21).

An analysis of revised i/d ratio rows eight and nine produced one .05 difference first semester, a trend for the second semester, and a .10 level difference the third semester. These three differences support the second hypothesis. As in the previous variables, hypotheses six and ten are not supported (See Tables 22, 23 and 24).

I/D ratio rows eight and nine yield similar results to i/d ratio eight and nine analysis. That is, the first semester the results tend to support hypothesis two, (.10 level) and the third semester they also support hypothesis two (.01) (See Tables 25, 26 and 27).

The next variable, extended indirect influence, is the index of indirect teaching which supports hypothesis two in all three semesters. The first and second semesters the differences are significant at the .05 level and the third semester the difference is significant at the .01 level (See Tables 28, 29 and 30).

The analysis of the extended direct influence variable produced no differences that were significant. The direction of the slight differences were in the right direction first and third semester but none were statistically significant (See Tables 31, 32 and 33).

The extended i/d ratio, the extended indirect influence divided

Table 16

i/d ROW 9

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.29	1	0.29	5.80*
C. T. Training	0.01	1	0.01	___
Interaction	0.00	1	0.00	
Error	1.73	32	0.05	
Total	2.03	35		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.80	9	0.85	18	0.82
	LT	9	0.65	9	0.65	18	0.65
	Total	18	0.72	18	0.75	36	0.74

Table 17

i/d ROW 9

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.01	1	0.01	—
C. T. Training	0.00	1	0.00	—
Interaction	0.04	1	0.04	—
Error	3.43	48	0.07	
Total	3.48	51		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.76	13	0.82	26	0.79
	LT	13	0.78	13	0.74	26	0.76
	Total	26	0.77	26	0.78	52	0.78

Table 18

i/d ROW 9

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.22	1	0.22	5.50*
C. T. Training	o.10	1	0.10	2.50
Interaction	0.00	1	0.00	——
Error	1.40	39	0.04	
Total	1.72	42		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.95	11	0.85	24	0.90
	LT	9	0.80	10	0.71	19	0.75
	Total	22	0.89	21	0.79	43	0.84

Table 19

I/D ROW 9

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.14	1	0.14	3.50
C. T. Training	0.05	1	0.05	1.25
Interaction	0.01	1	0.01	——
Error	1.33	32	0.04	
Total	1.53	35		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.67	9	0.71	18	0.69
	LT	9	0.51	9	0.62	18	0.56
	Total	18	0.59	18	0.66	36	0.63

Table 20

I/D ROW 9

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T Training	0.01	1	0.01	——
C T. Training	0.00	1	0.00	——
Interaction	0.14	1	0.14	4.67*
Error	1.21	48	0.03	
Total	1.36	51		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.63	13	0.68	26	0.66
	LT	13	0.65	13	0.61	26	0.63
	Total	26	0.64	26	0.64	52	0.64

Table 21

I/D ROW 9

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.83	1	0.83	16.60**
C. T. Training	0.15	1	0.15	3.00
Interaction	0.00	1	0.00	——
Error	1.79	39	0.05	
Total	2.77	42		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.61	11	0.75	24	0.68
	LT	9	0.35	10	0.45	19	0.41
	Total	22	0.51	21	0.61	43	0.56

Table 22

i/d - 8 and 9

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S T. Training	0.16	1	0.16	5.33*
C. T. Training	0.00	1	0.00	——
Interaction	0.01	1	0.01	——
Error	0.96	32	0.03	
Total	1.13	35		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		TOTAL	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.89	9	0.89	18	0.89
	LT	9	0.73	9	0.78	18	0.76
	Total	18	0.81	18	0.84	36	0.82

Table 23

i/d ROWS 8 and 9

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.02	1	0.02	2.00
C. T. Training	0.00	1	0.00	——
Interaction	0.00	1	0.00	——
Error	0.64	48	0.01	
Total	0.66	51		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		TOTAL	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.84	13	0.84	26	0.84
	LT	13	0.82	13	0.80	26	0.81
	Total	26	0.83	26	0.82	52	0.82

Table 24

i/d ROWS 8 and 9

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T Training	0.03	1	0.03	3.00
C. T. Training	0.04	1	0.04	4.00
Interaction	0.00	1	0.00	——
Error	0.32	39	0.01	
Total	0.39	42		

$*p < .05.$
$**p < .01.$

Means

		Cooperating Teacher Training					
		IA		LT		TOTAL	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.95	11	0.90	24	0.92
	LT	9	0.91	10	0.83	19	0.87
	Total	22	0.93	21	0.87	43	0.90

Table 25

I/D ROWS 8 and 9

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.11	1	0.11	3.67
C. T. Training	0.02	1	0.02	——
Interaction	0.03	1	0.03	1.00
Error	0.81	32	0.03	
Total	0.97	35		

$^{*}p \leq .05$.
$^{**}p \leq .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.78	9	0.78	18	0.78
	LT	9	0.61	9	0.72	18	0.66
	Total	18	0.70	18	0.75	36	0.72

Table 26

I/D ROWS 8 and 9

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T Training	0.00	1	0.00	____
C T. Training	0.00	1	0.00	____
Interaction	0.00	1	0.00	____
Error	0.73	38	0.02	
Total	0.74	51		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.71	13	0.70	26	0.70
	LT	13	0.71	13	0.69	26	0.70
	Total	26	0.71	26	0.70	52	0.70

Table 27

I/D ROWS 8 and 9

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.21	1	0.21	21.00**
C. T. Training	0.03	1	0.03	3.00
Interaction	0.00	1	0.00	——
Error	0.53	39	0.01	
Total	0.77	42		

$*p < .05.$
$**p < .01.$

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.74	11	0.80	24	0.77
	LT	9	0.61	10	0.65	19	0.63
	Total	22	0.69	21	0.73	43	0.71

Table 28

EXTENDED INDIRECT INFLUENCE

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	42.79	1	42.79	4.96*
C. T. Training	1.06	1	1.06	——
Interaction	0.02	1	0.02	——
Error	275.86	32	8.62	
Total	319.73	35		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	4.41	9	4.71	18	4.56
	LT	9	2.19	9	2.57	18	2.38
	Total	18	3.30	18	3.64	36	3.47

Table 29

EXTENDED INDIRECT INFLUENCE

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	32.01	1	32.01	4.62*
C. T. Training	0.15	1	0.15	____
Interaction	1.44	1	1.44	____
Error	332.45	48	6.93	
Total	366.05	51		

*p $< .05$.
**p $< .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	5.19	13	4.97	26	5.08
	LT	13	3.29	13	3.73	26	3.51
	Total	26	4.24	26	4.35	52	4.30

Table 30

EXTENDED INDIRECT INFLUENCE

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	24.72	1	24.72	8.47**
C. T. Training	1.37	1	1.37	——
Interaction	2.33	1	2.33	——
Error	113.85	39	2.92	
Total	142.27	42		

*p $<$ .05.
**p $<$ .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	3.22	11	4.05	24	3.60
	LT	9	2.16	10	2.05	19	2.10
	Total	22	2.79	21	3.10	43	2.94

Table 31

EXTENDED DIRECT INFLUENCE

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	3.55	1	3.55	____
C. T. Training	1.25	1	1.25	____
Interaction	3.41	1	3.41	____
Error	118.27	32	3.70	
Total	126.48	35		

*$p \leq .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	1.68	9	0.69	18	1.18
	LT	9	1.70	9	1.94	18	1.82
	Total	18	1.69	18	1.32	36	1.50

Table 32

EXTENDED DIRECT INFLUENCE

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.47	1	0.47	——
C. T. Training	5.25	1	5.25	1.28
Interaction	0.03	1	0.03	——
Error	197.33	48	4.11	
Total	203.08	51		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	1.73	13	2.32	26	2.02
	LT	13	1.50	13	2.17	26	1.84
	Total	26	1.62	26	2.24	52	1.93

Table 33

EXTENDED DIRECT INFLUENCE

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.69	1	0.69	—
C. T. Training	12.43	1	12.43	1.50
Interaction	0.29	1	0.29	
Error	324.12	39	8.31	
Total	337.53	42		

$*p < .05.$
$**p < .01.$

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.76	11	2.01	24	1.33
	LT	9	1.18	10	2.10	19	1.67
	Total	22	0.93	21	2.05	43	1.48

by extended direct influence, was significant first semester at .01 level and third semester at the .05 level. The second semester is again, not different and therefore as with previous variables the second hypothesis is supported by the first and third semester but not by the second. The sixth and tenth hypotheses are not supported by any of the tests which have been run so far (See Tables 34, 35 and 36).

I/D row nine divided by revised i/d row eight is a further analysis of a variable which is highly related to pupil achievement. Although only the third semester is significant (.05) all three semesters yield data in the direction predicted in hypothesis two. The results regarding the other two hypotheses are conflicting (See Tables 37, 38 and 39).

Revised i/d row nine/i/d row eight does seem to produce large differences in any of the analyses. While the differences are all in the proper direction to support hypothesis two, none of these differences were significant at an acceptable level. The data were conflicting with respect to hypotheses five and nine (See Tables 40, 41 and 42).

Analysis of the three indirect categories, one, two and three, offer support for hypothesis two but the results are conflicting for the other two hypotheses. For category one, although the differences for the three semesters are in the predicted direction, they never reach the .10 level.

Category two is in the predicted direction all three semesters and for first semester at the .10 level and third semester .05 level.

Analysis of category three yielded F ratios significant first semester .10, second .10 and third semester .05.

The analysis of these variables produces conflicting results

Table 34

EXTENDED i/d RATIO

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.56	1	0.56	8.00**
C. T. Training	0.04	1	0.04	___
Interaction	0.01	1	0.01	___
Error	2.20	32	0.07	
Total	2.81	35		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.78	9	0.81	18	0.80
	LT	9	0.49	9	0.60	18	0.54
	Total	18	0.64	18	0.70	36	0.67

Table 35

EXTENDED i/d RATIO

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.00	1	0.00	——
C. T. Training	0.02	1	0.02	——
Interaction	0.01	1	0.01	——
Error	4.93	48	0.10	
Total	4.96	51		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.72	13	0.65	26	0.68
	LT	13	0.70	13	0.69	26	0.70
	Total	26	0.71	26	0.67	52	0.69

Table 36

EXTENDED i/d RATIO

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.47	1	0.47	6.71*
C. T. Training	0.03	1	0.03	——
Interaction	0.02	1	0.02	——
Error	2.71	39	0.07	
Total	3.23	42		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.82	11	0.81	24	0.82
	LT	9	0.65	10	0.56	19	0.60
	Total	22	0.75	21	0.69	43	0.72

Table 37

I/D 9 / I/D 8

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.07	1	0.07	—
C. T. Training	0.10	1	0.10	—
Interaction	0.00	1	0.00	—
Error	4.00	32	0.13	
Total	4.17	35		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.75	9	0.86	18	0.80
	LT	9	0.66	9	0.77	18	0.72
	Total	18	0.70	18	0.82	36	0.76

Table 38

I/D ROW 9 / I/D ROW 8

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.16	1	0.16	1.78
C. T. Training	0.01	1	0.01	----
Interaction	0.13	1	0.13	1.44
Error	4.18	48	0.09	
Total	4.48	51		

*p $<$ .05.
**p $<$ .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.82	13	0.90	26	0.86
	LT	13	0.81	13	0.68	26	0.74
	Total	26	0.82	26	0.79	52	0.80

Table 39

I/D ROW 9 / I/D ROW 8

Third Semester

Analysis of Variation

Source of Variation	SS	df	MS	F
SS T. Training	0.47	1	0.47	4.27*
C. T. Training	0.38	1	0.38	3.45
Interaction	0.07	1	0.07	-----
Error	4.39	39	0.11	
Total	5.31	42		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.76	11	0.87	24	0.81
	LT	[illegible]	[illegible]	[illegible]	0.74	19	0.0.51
	Total	22	0.64	21	0.81	43	0.72

Table 40

i/d 9 / i/d 8

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.18	1	0.18	1.80
C. T. Training	0.03	1	0.03	——
Interaction	0.05	1	0.05	——
Error	3.26	32	0.10	
Total	3.52	35		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.87	9	1.00	18	0.94
	LT	9	0.80	9	0.78	18	0.79
	Total	18	0.84	18	0.89	36	0.86

Table 41

i/d ROW 9 / i/d ROW 8

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.03	1	0.03	___
C. T. Training	0.02	1	0.02	___
Interaction	0.19	1	0.19	3.80
Error	2.35	48	0.05	
Total	2.59	51		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.85	13	0.93	26	0.89
	LT	13	0.92	13	0.76	26	0.84
	Total	26	0.88	26	0.84	52	0.86

Table 42

i/d ROW 9 / i/d ROW 8

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.02	1	0.02	——
C. T. Training	0.01	1	0.01	——
Interaction	0.12	39	0.12	1.50
Error	3.15	39	0.08	
Total	3.30	42		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	1.01	11	0.88	24	0.95
	LT	9	0.86	10	0.94	19	0.90
	Total	22	0.95	21	0.91	43	0.93

with respect to the other two hypotheses (See Tables 43, 44, 45, 46, 47, 48, 49, 50 and 51).

Analysis of category six does not appear to support any of the hypotheses in any semester except hypotheses two, third semester (F= 5.36, P .05).

Category seven analysis does not produce support for any hypotheses except first semester hypothesis two, (F= 4.75, P .05) (See Tables 52, 53 and 54).

Category nine, student initiated talk is used here as an index of indirect teaching. The analysis of category nine supports hypothesis two but only in the third semester (See Tables 55, 56 and 57).

The last measure used as an index of indirectness was the 3-3 cell. This analysis offers support for the hypothesis two first semester (F= 3.91, P .10) and second semester (F= 5.36, P .05) but the third semester though the difference was in the right direction the F ratio was below 1 (See Tables 58, 59, 60, 61, 62 and 63).

Table 64 presents a summary of the appropriate results for hypotheses two, six and ten.

Of the twenty separate variables used (3 semesters) or sixty separate tests, eight turned out equal or in the direction not predicted. Not a single one of these eight produced an F ratio of one or more. On the other hand, of the fifty-two that turned out in the predicted direction, nine were significant at the .10 level, sixteen were significant at the .05 level and, three were significant at the .01 level.

On the basis of these results, hypothesis two, that student teachers taught Interaction Analysis were more indirect at the end of their student teaching experience than student teachers not so taught, is accepted.

Table 43

CATEGORY 1

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.18	1	0.18	1.20
C. T. Training	0.22	1	0.22	1.47
Interaction	0.09	1	0.09	____
Error	4.75	32	0.15	
Total	5.24	35		

$*p < .05.$
$**p < .01.$

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	0.38	9	0.12	18	0.25
	LT	9	0.09	9	0.14	18	0.12
	Total	18	0.24	18	0.13	36	0.18

Table 44

CATEGORY 1

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.53	1	0.53	2.65
C. T. Training	0.75	1	0.75	3.75
Interaction	0.16	1	0.16	——
Error	9.54	48	0.20	
Total	10.98	51		

$*p < .05.$
$**p < .01.$

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.25	13	0.60	26	0.42
	LT	13	0.16	13	0.29	26	0.22
	Total	26	0.20	26	0.44	52	0.32

Table 45

CATEGORY 1

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.25	1	0.25	1.79
C. T. Training	0.12	1	0.12	___
Interaction	0.16	1	0.12	1.14
Error	5.31	39	0.14	
Total	5.84	42		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.08	11	0.31	24	0.18
	LT	9	0.05	10	0.03	19	0.04
	Total	22	0.07	21	0.17	43	0.12

Table 46

CATEGORY 2

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	20.40	1	20.40	3.67
C. T. Training	13.69	1	13.69	2.46
Interaction	1.32	1	1.32	——
Error	177.80	32	5.56	
Total	213.21	35		

*p $< .05$.
**p $< .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	5.15	9	6.00	18	5.58
	LT	9	3.26	9	4.88	18	4.07
	Total	18	4.20	18	5.44	36	4.82

Table 47

CATEGORY 2

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.22	1	0.22	___
C. T. Training	1.80	1	1.80	___
Interaction	0.09	1	0.09	___
Error	237.90	48	4.96	
Total	240.01	51		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	4.71	13	4.43	26	4.57
	LT	13	4.67	13	4.21	26	4.44
	Total	26	4.69	26	4.32	52	4.50

Table 48

CATEGORY 2

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	34.40	1	34.40	5.58*
C. T. Training	2.00	1	2.00	——
Interaction	2.09	1	2.09	——
Error	240.75	39	6.17	
Total	279.24	42		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	4.62	11	5.50	24	5.02
	LT	9	3.26	10	3.25	19	3.26
	Total	22	4.06	21	4.43	43	4.24

Table 49

CATEGORY 3

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	58.65	1	58.65	3.80
C. T. Training	36.82	1	36.82	2.38
Interaction	14.50	1	14.50	——
Error	494.43	32	15.45	
Total	604.41	35		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	7.61	9	8.36	18	7.98
	LT	9	3.79	9	7.08	18	5.44
	Total	18	5.70	18	7.72	36	6.71

Table 50

CATEGORY 3

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	40.04	1	40.04	4.19*
C. T. Training	0.20	1	0.20	——
Interaction	2.37	1	2.37	——
Error	458.74	48	9.56	
Total	501.36	51		

*$p \leq .05$.
**$p \leq .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	8.57	13	8,27	26	8.42
	LT	13	6.39	13	6.94	26	6.66
	Total	26	7.48	26	7.60	52	7.54

Table 51

CATEGORY 3

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	29.63	1	29.63	3.22
C. T. Training	21.44	1	21.44	2.33
Interaction	0.29	1	0.29	——
Error	358.55	39	9.19	
Total	409.91	42		

$*p < .05.$
$**p < .01.$

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	6.40	11	7.99	24	7.13
	LT	9	4.89	10	6.15	19	5.55
	Total	22	5.78	21	7.11	43	6.43

Table 52

CATEGORY 6

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	3.47	1	3.47	——
C. T. Training	0.77	1	0.77	——
Interaction	17.04	1	17.04	2.02
Error	270.51	32	8.45	
Total	291.79	35		

$*p < .05.$
$**p < .01.$

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	2.97	9	1.89	18	2.43
	LT	9	2.21	9	3.88	18	3.04
	Total	18	2.59	18	2.88	36	2.74

Table 53

CATEGORY 6

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.30	1	0.30	——
C. T. Training	6.28	1	6.28	——
Interaction	5.45	1	5.45	——
Error	355.52	48	7.41	
Total	367.54	51		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	2.66	13	4.00	26	3.33
	LT	13	3.15	13	3.20	26	3.18
	Total	26	2.90	26	3.60	52	3.25

Table 54

CATEGORY 6

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	26.20	1	26.20	5.36*
C. T. Training	9.83	1	9.83	2.01
Interaction	19.10	1	19.10	3.91
Error	190.72	39	4.89	
Total	245.85	42		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	1.77	11	1.39	24	1.59
	LT	9	2.00	10	4.31	19	3.21
	Total	22	1.86	21	2.78	43	2.31

Table 55

CATEGORY 7

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	15.47	1	15.47	4.75*
C. T. Training	0.03	1	0.03	____
Interaction	0.00	1	0.00	____
Error	104.41	32	3.26	
Total	119.91	35		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	1.39	9	1.44	18	1.42
	LT	9	2.70	9	2.76	18	2.73
	Total	18	2.04	18	2.10	36	2.07

Table 56

CATEGORY 7

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.47	1	0.47	——
C. T. Training	6.22	1	6.22	1.23
Interaction	4.60	1	4.60	——
Error	243.18	48	5.07	
Total	254.48	51		

*p .05.
**p .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	2.34	13	2.44	26	2.39
	LT	13	1.94	13	3.22	26	2.58
	Total	26	2.14	26	2.83	52	2.48

Table 57

CATEGORY 7

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.51	1	0.51	___
C. T. Training	13.97	1	13.97	___
Interaction	9.33	1	9.33	___
Error	551.35	39	14.14	
Total	575.16	42		

*p .05.
**p .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	0.76	11	2.85	24	1.72
	LT	9	1.48	10	1.69	19	1.59
	Total	22	1.05	21	2.30	43	1.66

Table 58

CATEGORY 9

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.03	1	0.03	———
C. T. Training	10.98	1	10.98	———
Interaction	9.82	1	9.82	———
Error	2953.28	32	92.29	
Total	2974.11	35		

$*p < .05.$
$**p < .01.$

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	16.82	9	16.76	18	16.79
	LT	9	17.81	9	15.66	18	16.74
	Total	18	17.32	18	16.21	36	16.76

Table 59

CATEGORY 9

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	74.81	1	74.81	___
C. T. Training	122.43	1	122.43	1.51
Interaction	0.07	1	0.07	___
Error	3898.40	48	81.22	
Total	4020.83	51		

$^{*}p < .05.$
$^{**}p < .01.$

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	17.09	13	20.08	26	18.58
	LT	13	19.41	13	22.56	26	20.98
	Total	26	18.25	26	21.32	52	19.78

Table 60

CATEGORY 9

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	726.60	1	726.60	8.35**
C. T. Training	688.57	1	688.57	7.91**
Interaction	835.52	1	835.52	9.60**
Error	3394.51	39	87.04	
Total	5645.20	42		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	10.50	11	27.47	24	18.28
	LT	9	11.10	10	10.28	19	10.67
	Total	22	10.75	21	19.28	43	14.91

Table 61

3-3 CELL

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	8.01	1	8.01	3.91
C. T. Training	0.08	1	0.08	——
Interaction	0.04	1	0.04	——
Error	65.74	32	2.05	
Total	74.23	35		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	1.71	9	2.01	18	1.86
	LT	9	0.98	9	0.86	18	0.92
	Total	18	1.34	18	1.44	36	1.39

Table 62

3-3 CELL

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	15.38	1	15.38	5.36*
C. T. Training	0.18	1	0.18	——
Interaction	1.31	1	1.31	——
Error	137.59	48	2.87	
Total	154.46	51		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	2.71	13	2.28	26	2.50
	LT	13	1.31	13	1.51	26	1.41
	Total	26	2.01	26	1.90	52	1.95

Table 63

3-3 CELL

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.44	1	0.44	___
C. T. Training	0.01	1	0.01	___
Interaction	0.29	1	0.29	___
Error	156.72	39	4.02	
Total	157.46	42		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	1.38	11	1.19	24	1.29
	LT	9	1.01	10	1.15	19	1.08
	Total	22	1.23	21	1.17	43	1.20

Table 64

SUMMARY OF ANALYSIS RELEVANT TO TESTING OF HYPOTHESES 2, 6, 10 [1]

VARIABLE	ST TRAINING			CT TRAINING			INTERACTION		
	1	2	3	1	2	3	1	2	3
104 (i/d)	1.37	+	3.39	-	+	+	-	+	+
105 (I/D)	+	-	6.50*	-4.00	-	-	-	-	-
106 (i/d-8)	3.25	1.33	5.00*	-	+	+	+	+	-
107 (I/D-8)	1.09	-	5.50*	-	+	-	+	-	-
108 (i/d-9)	5.80*	+	5.50*	-	-	+	-	-	+
109 (I/D-9)	3.50	+	16.60**	1.25	-	-	-	-	+
110 (i/d-8+9)	5.33*	+	3.00	-	+	-4.00	-	-	+
111 (I/D-8+9)	3.67	-	21.00**	-	+	3.00	-	-	-
112 (Ex.Ind.)	4.96*	4.62*	8.47*	-	-	-	-	+	-
113 (Ex.Dir.)	+	-	+	-	1.28	1.50	+	-	+
114 (Ex.Ind./ Ex.Dir.)	8.00**	-	6.71*	-	+	+	-	+	+
122 (i/d-9/ i/d-8)	1.80	+	+	-	+	+	-	-	+
123 (I/D-9/ i/d-8)	+	1.28	4.27*	-	+	-	-	-	-
129 (Col. 1)	1.20	2.65	1.79	1.47	-3.75	-	+	-	-
130 (Col. 2)	3.67	+	5.58*	-2.46	+	-	-	+	-
131 (Col. 3)	3.80	4.19*	3.22	-2.38	+	-2.33	-	+	-
134 (Col. 6)	+	-	5.36*	+	+	2.01	-	+	+
135 (Col. 7)	4.75*	+	-	+	1.23	+	+	-	+
137 (Col. 9)	+	-	8.35**	+	-	-7.91**	-	-	-
139 (3-3Cell)	3.91	5.36*	+	-	+	+	-	+	+

[1] A plus indicates the predicted direction.
A minus indicates not in the predicted direction.
All F ratios without minus signs were in the predicted direction.

* .05 level of probability.
** .01 level of probability.

These data do not give as clear a picture for hypothesis six. Of the sixty analyses, thirty were not in the predicted direction. Several of the differences in the wrong direction also produced F ratios above one, and one was significant at the .01 level.

On the basis of these data, hypothesis six was rejected.

Hypothesis ten was tested by the interaction effects of the two independent variables. In only one case was the interaction effect at .05 level, this was column nine the third semester. An inspection of means for that semester indicates that the Interaction Analysis trained and supervised group did not have the highest percentage in category nine. Again since these differences were in the predicted direction only twenty-two out of sixty times the hypothesis was rejected.

The results of testing hypotheses three, seven and eleven are presented here. Hypothesis three predicted that the pupils in classes of student teachers trained in Interaction Analysis would perceive their student teachers as more indirect than would the pupils of the student teachers trained in learning theory. Hypothesis seven, student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis were perceived by their pupils as more indirect at the end of student teaching than student teachers working with cooperating teachers not trained in Interaction Analysis, and hypothesis eleven, student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were perceived by their pupils as more indirect at the end of student teaching than were student teachers not receiving such training and supervision.

Two separate instruments were used to test the hypotheses, both are part of the Pupil Perception of Teacher Influence Scale.

The results of the first, a four item multiple choice scale show significant differences the third semester, supporting hypothesis three (P .01). The differences the first two semesters are in the predicted direction but not at an appropriate level of significance. The results of this first scale do not offer any support for the other two hypotheses (See Tables 65, 66 and 67).

The second set of items which was used to test the third, seventh and eleventh hypotheses were three items that used nine point scales. These three items had been used successfully by Amidon (1959) (See Tables 68, 69 and 70).

The results of these items produced differences significant at .05 level the first semester and the .10 level the third semester in support of the third hypothesis. The results for the second semester are in the wrong direction. The data with respect to hypotheses seven and eleven are conflicting. Therefore, hypotheses seven and eleven are rejected while hypothesis three is left in doubt.

Hypotheses four, eight and twelve had to do with student teachers' attitudes toward the teaching situation. The hypotheses were:

4.) Student teachers taught Interaction Analysis had more positive attitudes toward teaching at the completion of student teaching than students not taught Interaction Analysis.

8.) Student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis had more positive attitudes toward the teaching situation than student teachers working with cooperating teachers not trained in Interaction Analysis.

12.) Student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis had more positive attitudes toward teaching at the completion of student teaching than did student teachers not receiving such training and supervision.

Table 65

PUPIL PERCEPTION OF TEACHER INFLUENCE
ITEMS 1-4

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.26	1	0.26	1.53
C. T. Training	0.03	1	0.03	____
Interaction	0.01	1	0.01	____
Error	5.40	32	0.17	
Total	5.69	35		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	3.00	9	3.06	18	3.03
	LT	9	2.84	9	2.88	18	2.86
	Total	18	2.92	18	2.97	36	2.94

Table 66

PUPIL PERCEPTION OF TEACHER INFLUENCE

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.00	1	0.00	——
C. T. Training	0.03	1	0.03	——
Interaction	0.12	1	0.12	——
Error	8.70	48	0.18	
Total	8.85	51		

*p ∠ .05.
**p ∠ .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	2.83	13	2.97	26	2.90
	LT	13	2.91	13	2.86	26	2.88
	Total	26	2.87	26	2.92	52	2.89

Table 67

PUPIL PERCEPTION OF TEACHER INFLUENCE

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	1.41	1	1.41	7.40**
C. T. Training	0.06	1	0.06	___
Interaction	0.00	1	0.00	___
Error	7.60	39	0.19	
Total	9.07	42		

*p ≤ .05.
**p ≤ .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	3.15	11	3.24	24	3.19
	LT	9	2.80	10	2.86	19	2.83
	Total	22	3.00	21	3.06	43	3.03

Table 68

PUPIL PERCEPTION OF TEACHER INFLUENCE

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	6.43	1	6.43	5.76*
C. T. Training	1.81	1	1.81	1.62
Interaction	0.07	1	0.07	——
Error	35.70	32	1.12	
Total	44.01	35		

$*p < .05.$
$**p < .01.$

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	16.37	9	16.73	18	16.55
	LT	9	15.43	9	15.97	18	15.70
	Total	18	15.90	18	16.35	36	16.12

Table 69

PUPIL PERCEPTION OF TEACHER INFLUENCE

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	0.06	1	0.06	___
C. T. Training	0.46	1	0.46	___
Interaction	3.13	1	3.13	___
Error	247.25	48	5. 15	
Total	250.90	51		

*$p \le .05$.
**$p \le .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	16.10	13	15.04	26	15.57
	LT	13	15.67	13	15.98	26	15.82
	Total	26	15.88	26	15.51	52	15.70

Table 70

PUPIL PERCEPTION OF TEACHER INFLUENCE

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	10.22	1	10.22	3.13
C. T. Training	0.71	1	0.71	——
Interaction	0.76	1	0.76	——
Error	127.51	39	3.27	
Total	139.20	42		

*$p < .05$.
**$p < .01$.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	16.13	11	16.66	24	16.37
	LT	9	15.59	10	15.59	19	15.59
	Total	22	15.91	21	16.15	43	16.03

Before presenting results of the analysis of the Teaching Situation Reaction Test, the results of scores on the Dogmatism Scale are presented. Analysis of these scores indicates that there were no systematic differences on the Dogmatism Scale.

There do not appear to be consistent results for hypothese four, eight or twleve. Hypothesis four is supported second semester, F significant at the .05 level, but first semester there is a .10 level difference in the wrong direction. Hypothesis eight is supported by a .05 difference second semester, but third semester, though not significant, the difference is in the wrong direction. There is no support for hypothesis twelve (See Tables 71, 72, 73, 74, 75 and 76).

Table 71

ANALYSIS OF SCORES ON DOGMATISM SCALE

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	2898.03	1	2898.03	1.60
C. T. Training	2826.69	1	2826.69	1.56
Interaction	3268.03	1	3268.03	1.80
Error	58088.00	32	1815.25	
Total	67080.75	35		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	232.22	9	233.55	18	232.89
	LT	9	233.33	9	196.55	18	214.94
	Total	18	232.78	18	215.05	36	223.89

Table 72

ANALYSIS OF SCORES ON DOGMATISM SCALE

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	549.25	1	549.25	___
C. T. Training	1211.56	1	1211.56	___
Interaction	1391.55	1	1391.55	___
Error	67029.08	48	1396.44	
Total	70181.45	51		

*p · .05.
**p ‹ .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	211.07	13	211.76	26	211.42
	LT	13	210.33	13	207.92	26	209.08
	Total	26	210.65	26	209.84	52	210.24

Table 73

ANALYSIS OF SCORES ON DOGMATISM SCALE

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	215.27	1	215.27	—
C. T. Training	49.50	1	49.50	—
Interaction	1121.40	1	1121.40	1.16
Error	27602.31	39	964.16	
Total	38933.48	42		

*p $<$ .05.
**p $<$ .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	204.62	11	217.09	24	210.33
	LT	9	219.44	10	211.30	19	215.16
	Total	22	210.68	21	214.33	43	212.47

Table 74

ANALYSIS OF TEACHING SITUATION REACTION TEST

First Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	152.11	1	152.11	3.37
C. T. Training	28.44	1	28.44	___
Interaction	53.78	1	53.78	1.19
Error	1442.66	32	45.08	
Total	1676.99	35		

$^{*}p < .05.$
$^{**}p < .01.$

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	9	104.88	9	105.55	18	105.22
	LT	9	103.22	9	99.00	18	101.11
	Total	18	104.05	18	102.28	36	103.16

Table 75

ANALYSIS OF TEACHING SITUATION REACTION TEST

Second Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	623.07	1	623.07	4.60*
C. T. Training	753.92	1	753.92	5.57*
Interaction	1320.08	1	1320.08	10.75**
Error	6500.62	48	135.43	
Total	9197.69	51		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	99.30	13	81.61	26	90.46
	LT	13	96.15	13	98.61	26	97.38
	Total	26	97.72	26	90.11	52	93.92

Table 76

ANALYSIS OF TEACHING SITUATION REACTION TEST

Third Semester

Analysis of Variance

Source of Variation	SS	df	MS	F
S. T. Training	14.70	1	14.70	——
C. T. Training	52.99	1	52.99	——
Interaction	275.74	1	275.74	1.59
Error	6746.86	39	173.00	
Total	7090.29	42		

*p < .05.
**p < .01.

Means

		Cooperating Teacher Training					
		IA		LT		Total	
		N	Mean	N	Mean	N	Mean
Student Teacher Training	IA	13	88.38	11	95.73	24	91.75
	LT	9	94.67	10	91.80	19	93.16
	Total	22	90.95	21	93.86	43	92.37

Summary and Discussion

Of the twelve hypotheses, only one was accepted, two were in doubt and the rest must be rejected in this study. Perhaps the training of cooperating teachers was inadequate, at least it did not have a measureable effect. Perhaps the Interaction Analysis tool was the only instrument sensative enough to register the effects of training in Interaction Analysis, since the rater and paper and pencil tests did not register differences.

The results of the test of the single hypothesis that was accepted do appear to have a potential impact on the field of teacher education. Apparently the immediate effect of teaching student teachers Interaction Analysis is to help them become more indirect in working with pupils. There also is some evidence that their children perceive this indirect teaching but these results are not as clear cut.

Perhaps the most disappointing and yet encouraging result concerned the training of cooperating teachers and the effect this had on student teachers. Apparently in this study there was no systematic effect of training the cooperating teacher. Yet given the traditional structure of the secondary student teaching program at Temple this may not be surprising. It may also be possible that the amount of training and contact may not have been adequate for the cooperating teacher. Nevertheless, and this is the optimistic part, regardless of training of cooperating teachers, student teachers with course work in Interaction Analysis were more indirect on nearly all of the twenty indices used.

FINAL STATEMENT

CHAPTER V

Perspective

At the present time, teacher education programs at most colleges in the United States appear to be undergoing substantial revision. Much of this change appears to be taking place in the practice teaching or experience part of the teacher education programs. Further, the emphasis is often on the use of recent research procedures as a basis for analyzing the teaching act.

Inherent in the emphasis just described seems to be the assumption that if a student teacher studies his teaching objectively "in a scientific way" he will develop more self control over his instructional behavior, and thus change in directions consistent with the general goals of teacher education.

In one sense, this project was designed to test this assumption. The AACTE report of the TEAM project suggests "a study of teaching" orientation which is also apparently built on the assumption just stated. The focus of this study then is to use a tool for studying teaching as a major part of a teacher education program.

A number of studies reported findings which seem to support the assumption that training in Interaction Analysis as a method for studying teaching produces student teachers that are more indirect and accepting and less critical and directive than student teachers traditionally trained. (Furst, Simon, Hough)

A second element which appears significant in rethinking teacher education programs is the role and training of the cooperating or student teacher supervisor. This teacher is often thought to provide a model for the student teacher and therefore is particularly a crucial factor in the teacher education system. Recently, a trend seems to have emerged regarding the training and selection of these supervising teachers. This trend seems to involve the training of the supervising teacher in methods for the systematic observation of teaching behavior. This study was designed then to test the value of training cooperating teachers in this way.

A second general purpose of this study then was to test the assumption that the training of the cooperating teacher results in the development of student teachers who teach in ways that are apparently consistent with the goals of teacher education.

This project was designed to determine some specific relationships between the training of cooperating teachers and student teachers and the behavior of the student teachers at the completion of student teaching. If student teachers are trained in a method of classroom observation (Interaction Analysis) are they more indirect at the completion of student teaching than student teachers trained more traditionally; and does training of their cooperating teachers in classroom observation (Interaction Analysis) produce more indirect student teaching behavior than traditional training of cooperating teachers.

This study was a two and a half year study designed to test the effects training in Interaction Analysis had on the classroom behavior of student teachers. The study also tested the effects that training cooperating teachers in Interaction Analysis had on student teachers' behavior.

In order to determine the effects on student teachers, they were observed with trained Interaction Analysis observers, rated by an impartial observer, administered teaching attitude tests and rated by their pupils. There were twelve hypotheses:

1.) Student teachers who were taught Interaction Analysis were rated by impartial observers as more effective teachers than student teachers not taught Interaction Analysis.

2.) Student teachers taught Interaction Analysis were more indirect at the end of their student teaching experience than student teachers not so taught.

3.) Student teachers taught Interaction Analysis were perceived by their pupils as being more indirect at the end of student teaching than were student teachers not so taught.

4.) Student teachers taught Interaction Analysis had more positive attitudes toward teaching at the completion of student teaching than students not taught Interaction Analysis.

5.) Student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis were rated by impartial observers as more effective teachers than student teachers working with cooperating teachers not trained in Interaction Analysis.

6.) Student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis were more indirect at the end of student teaching than student teachers working with cooperating teachers not trained in Interaction Analysis.

7.) Student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis were perceived by their pupils as more indirect at the end of student teaching than student teachers working with cooperating teachers not trained in Interaction Analysis.

8.) Student teachers supervised by those cooperating teachers who had been trained in Interaction Analysis had more positive attitudes toward the teaching situation than student teachers working with cooperating teachers not trained in Interaction Analysis.

9.) Student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were rated by impartial observers as more effective teachers than student teachers not receiving such training and supervision.

10.) Student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were more indirect at the end of student teaching than were student teachers not receiving such training and supervision.

11.) Student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis were perceived by their pupils as more indirect at the end of student teaching than were student teachers not receiving such training and supervision.

12.) Student teachers who were taught Interaction Analysis and were supervised by cooperating teachers trained in Interaction Analysis had more positive attitudes toward teaching at the completion of student teaching than did student teachers not receiving such training and supervision.

Only hypothesis two was accepted. Yet when added to all the previous research, Kirk (1964), Amidon and Hough (1964), Moskowitz (1966), and Simon (1966) this finding is rather compelling.

The effects of training on student teachers are apparently clear. That student teachers can be helped to become more indirect, accepting, and supportive seems to be a predictable result of training in Interaction Analysis.

Conditions for Application to Teacher Education

The basic rationale for the study was concerned with the nature of two elements in the student teaching experience. One, the supervision which the student teacher receives from the cooperating teacher, and, two, course experience the student has during student has during student teaching.

The supervisor (cooperating teacher) was viewed as the person who can work with the student teacher on a day to day basis. He is the person who can give the student teacher immediate feedback about the effects of his teaching upon the class. There are several conditions which seemed essential to the effectiveness of the supervision:

1) The use of a common language. There are many words and phrases used by supervisors which do not have the same meaning to all. Examples of some of these phrases often used with student teachers are "well organized," "interesting presentation," "good visual display," "adequate posture" and "enthusiastic." One method of making this language useful is to use terms which have identical operational meaning to both student teacher and cooperating teacher. Thus when talking to the student teacher the cooperating teacher should use words and phrases which are descriptive and objective, and directly relevant to the teaching activities. Interaction Analysis makes this operational precision for the language used by teachers and supervisors possible.

2) An effective observational tool. A basic ingredient in supervision is accurate observation. The supervisor needs to be able to accurately assess the teaching situation so that he can have an accurate objective picture of what took place. The observational training should help the supervisor improve his observational skill.

3) Skill in communicating with student teacher. The observation skill will be of little use if the cooperating teacher cannot communicate what he has observed to the student teacher. This

communication should be facilitated by the first two conditions, but the skill of the cooperating teacher is still an essential part of the improvement of the student teaching experience. The category system helps to focus on the basic skills of communication which the supervisor may need to perfect.

Theoretically, the conditions just described were met. Yet the cooperating teacher training seemed to make little difference in the behavior of student teachers. Nevertheless, the basic principles appear sound---and with more extensive training of the cooperating teacher the study would seem worth replicating.

The second important factor over which the college has some influence is the college course work which the student teacher takes during student teaching. The essential conditions which should be met by the course are:

1.) A tool (tools) for studying teaching. Teachers perform their jobs in interaction with children. This is the core of the teaching experience. They can use research tools to better understand their own teaching behavior. Interaction Analysis is an example of one of these tools.

2.) An attitude of scientific inquiry. Student teachers are teaching in a laboratory. They have the opportunity to experiment with their teaching and receive feedback about the results of their experiments. Interaction Analysis gives then a tool that will help them develop an inquiring attitude toward their own teaching.

3.) A repertoire of social skills. There are many skills used in teaching, the student teacher must have available enough of a variety of skills. He also must feel successful at the same time he is experimenting with his behavior. The category system helps the student identify the specific skills he needs to practice.

The two ingredients course work and supervision are important in a student teaching program. A student teacher needs tools so that he can develop his own direction as well as help in making maximum use of the tools. But perhaps the whole program of teacher education should be considered in the perspective of proposed or attempted change. Change is difficult---and those who have attempted to initiate change know that they are often confronted with barriers. But those who propose change in an area of human behavior need to be particularly aware of the barriers to change. Do people wish to experience those things that are unknown to them? Do teachers or student teachers want to try out roles that they have never tried before? Teachers are people and they like other people, cannot easily try on a new role without feeling foolish, that it is artificial, or that they are inadequate. But, experimentation is the essence of improvement. If the whole area of teacher education is to improve (change), then we must do things we do not want to do or things that may seem uncomfortable. We must encourage student teachers to experiment. This is the essence of this study---that is, student teachers were encouraged to try something new, different, and then were given a chance to evaluate their own attempts at Improving Teaching.

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APPENDIX A

SKILL SESSIONS USED IN THE TWO EXPERIMENTAL COURSES

SKILL SESSIONS

Instant Role Playing

Purpose: To get students to plan and to be able to produce and elicit behaviors which they wish on the spot. When used: After student teachers have developed a fair amount of skill in producing categories at will. This usually comes midway or later in the semester.

Descriptive statements of classroom behaviors and principles from learning theory are written on slips of paper. Each student is given one of these and is told to plan a micro-teaching segment of about 5 minutes in which he will carry out the specified interaction stated on the paper. The student teachers pair off in twos and consult with each other to get some ideas as to what to do to produce these behaviors. No one else is to know what is on each student's slip of paper. After five to ten minutes of planning time, each student teacher role plays with the class. As each finishes, the group tries to determine what it was the student teacher tried to elicit. Listed below are some of the behaviors which the students are asked to produce:

1. Reinforcement of responses
2. Acceptance of responses
3. Aversive stimulation
4. Acceptance of student feeling
5. Guided discovery
6. Student talk which is not in answer to a question or a command
7. Corrective feedback

8. Student response which is divergent

9. Encouragement which motivates student talk (followed by student talk)

10. Evaluation with public criteria

11. Student-to-student interaction

Discussion usually follows each roleplaying segment. At times the students are unable to successfully carry out the behaviors. During the discussion afterwards other members of the class may attempt to produce those behaviors which stumped a classmate.

Do-It-Yourself Systems

Purpose: To comprehend the complexity of thought which goes into the development of a category system for analyzing classroom interaction and to appreciate more fully those systems which will be studied. When used: Early in the term before being introduced to any category system for analyzing classroom interaction.

An underlying rationale for the following procedure is to have the student teachers experience and discover some of the concepts involved in what is about to be studied, namely systems for categorizing classroom interaction. In this way the learners come to understand many of the processes involved which are otherwise taken for granted.

The student teachers are put into groups. Their task is to develop an objective system for making classroom observations so that they will be able to analyze teaching with it. Once the students have finally developed systems of their own, each group tells the class about their system. Others in the class may ask questions and challenge the groups concerning their system. Then a videotape or an audio tape is played before the class. Each group categorizes the interaction of the lesson, using their individual systems. After categorizing with their systems, the groups report back their reactions, the strengths and weaknesses, and what they seem to have overlooked in their systems.

In the following meeting the student teachers are led into discovering the categories in the Flanders system of interaction analysis. At this point they are appreciative of the complexity of the problem of categorizing classroom interaction and impressed with the simplicity, yet the inclusiveness, of the categories which Flanders deduced for its study.

No Questions Asked

Purpose: To develop skill in permitting pupils to bring forth the content desired without the typically used teacher behaviors of directing, giving information, or soliciting it. When used: Late in the term when student teachers are quite skilled in their use of behaviors.

Teachers are notorious for being bearers of information and for then checking out this information and whether it has been acquired by the use of questions. A very taxing skill session is to ask each student teacher to write down a piece of information on a slip of paper. They are then to attempt to draw out this piece of information from the group, but they are not to ask any questions or give directions in order to get this information from the group.

Ten Categories?

Purpose: To develop skill in producing shades of differences in the various categories. To illustrate that the ten categories are limitless. When used: Midway to late in the term when the student teachers can quickly produce categories at will and can see discriminations within a category.

One category at a time in the Flanders system is gone into in depth. The instructor provides a number of situations in which a particular category is to be used. The student teachers are to produce different types of responses using the same category, which may in effect produce different feelings in pupils.

Situations of particular interest to the student teachers call for the use of different types of sevens, or ways a teacher may use criticism. Examples of situations which can be used are:

1. Will has just hit Tom over the head with a book. (Criticism can be used in which the teacher may reject Will's behavior, or accept his feeling but reject the behavior.)

2. Evan has just said that pronouns are words which show action. (In criticizing, the teacher may tell Evan he is wrong and admonish him for his error, or tell him he is wrong and give him the correct information.)

3. Bob does not understand why the teacher refused to correct his composition. (The teacher can chastise Bob for the appearance of his composition, or the criticism can inform Bob that it was not possible to correct the paper because of the difficulty of reading it.)

The student teachers go into groups and make up additional examples to practice with. The situations, the possible ways of handling them, and the hypothesized effects of the teacher behaviors are brought out for discussion.

Each of the categories has the same potential for provoking thoughtful discrimination. Since category one is so seldom used, it is a particularly worthwhile one to practice with. The student teachers come to see that there are potential times which they were not aware of when acceptance of feelings is appropriate.

What happens when category two is used? What are the effects of different kinds of praise? How do people react to different kinds of praise? This is also an area worth examining. It is usually decided that some kinds of praise cut off communication for the individual being praised or else for the one who is not praised, as he decides his contribution is not so good after all.

How do pupils react to having their ideas used? When is a teacher using a pupil's ideas and when is it really the teacher's own idea which is being reinforced? What is the effect of repeating the exact words with which the pupil responded? These are points which come up when category three, acceptance and use of students' ideas, is expounded.

If the student teachers believed that the Flanders categories were confining prior to this session, they begin to see that there are really a multitude of dimensions to each of the categories.

The Three-Stage Rocket

Purpose: Helping student teachers gain insight into the effects of pertinent behaviors in communication. Building these skills into the behavioral repertoire of the student teachers by giving concentrated practice in their use.

When used: Midway through the semester or some time thereafter when the student teachers are ready to examine the discreteness of behaviors and to make some changes in their own behavior.

A regular classroom discussion is held while a series of regulations are imposed, one at a time, on the nature of the interaction. Each regulation is purposely chosen to permit practice in a specific skill or to draw attention to the effects of monitoring a specific behavior. Each regulation is called a stage of a rocket. Some examples of possible stages of the rocket are:

Stage 1. Before anyone gives his own opinion or raises a question, he must first reflect or clarify the idea of the person who participated immediately before him. The purpose of this stage is for the student teachers to _listen to each other_ more and to focus more on the ideas of others in a discussion.

Stage 2. In addition to the stipulation in Stage 1, each person after he has reflected the idea of the person who spoke before him can then only speak for no more than 15 seconds at a time. This stage is to curtail the amount of continuous participation of certain individuals so the quantity that any one person speaks is more equally proportioned.

Stage 3. Along with the conditions in Stages 1 and 2, everyone must participate at least once within a certain designated time, such as five minutes. Controlling the participation in this way makes certain that all group members get an opportunity to speak and encourages those who normally monopolize the group to hold back so that the others get their turns.

Rockets have been known to advance to seven stages. Any skill which seems needed in a particular group can be added. If there is a problem of certain students' getting into the discussion so rapidly that others do not get a turn, it is helpful to have one stage be that those people must count three before they begin to speak. This helps to equalize the opportunity to speak and gives such people the feeling of what it is like to wish to speak but not be able to get into the discussion. Sometimes the student teachers themselves will think of a stage which the group seems to need practice in and add it to the rocket.

Blind Matrix Interpretation

Purpose: Showing the students they can analyze and interprèt a lesson they never heard or saw by means of reading a matrix. When used: This skill session should be attempted only after considerable skill in tallying has been accomplished by the class so that the session does not become known as "the blind leading the blind."

The class is divided into two groups. Each group listens to a different tape of a classroom lesson for about seven minutes, tallies it, and builds a matrix. The groups come back together, and the students pair off in twos or fours. Matrices are exchanged, and the student teachers attempt to reconstruct the lessons they did not hear by means of reading the matrix. The students discover that they can interpret the matrix of a lesson they have neither heard not seen before.

This skill session should be attempted only after considerable skill in tallying has been accomplished by the class so that the session does not become known as "the blind leading the blind."

How Many Ways Can You Tell a Kid He's Wrong?

Purpose: To illustrate to student teachers that there are countless ways to deal with the commonly occurring situation of pupils' giving wrong answers besides the standard, "No, that's not right." When used: Early in the term when student teachers say something like, "But how do you tell a pupil he's wrong without criticizing him?"

An example is taken from a lesson recently taught in one of the student teacher's classes in which an incorrect response was given by a pupil. Buzz groups compose a variety of responses the teacher could make, using Flanders' categories.

For example, to the question, "How much is 15 squared?" a student responds, "144." The following are some ways the teacher might respond:

"Show us how you got that answer."

"You gave us the answer to how much is 12 squared."

"Would you like to think it over and try again?"

"I think you were absent when we studied this."

Each group reads its responses for all to hear. It becomes evident by the variety of responses produced that there are countless ways to deal with the commonly occurring situation of a student's giving a wrong answer besides the standard, "No, that's not right."

Getting to Know You

Purpose: Beginning to develop skill in producing specific categories at will. When used: At the very beginning of the term, shortly after students have learned the Flanders categories.

New friendships are given an opportunity to blossom by this skill session. Each member writes down his phone number and communicates it by producing a logical classroom dialogue out of the numbers based upon the Flanders' categories. (The digit zero is treated as a ten.) The others in the classroom are to write down the categories they hear produced. Thus they exchange phone numbers. An example might be:

Take out your homework for today.
Ted, read your answer to the first problem.
Don't tell me you don't have your assignment again!
Doing homework helps us to know what we do and do not understand.
Who has the answer to the first problem?
Ted, you look like you'd like to try.
Good for you to want to make up for not having done the work.

(And now you know my number.)

Skill is developed in producing categories, along with a touch of humor, and who knows who will call whom!

Take a Number, or Anyone for Bridge?

Purpose: To develop skill in both producing and observing behaviors as categorized in the Flanders system. When used: In the early part of the semester. This skill session follows "Getting to Know You" and takes the student to a more advanced stage in these skills.

Groups of three are formed. A deck of cards with a string of numbers written on each card is provided each group.

One of the group members acts as the teacher and a second as the pupil. These two members spontaneously produce the sequences of categories written on a number of the cards. The third member tallies the interaction he observes and feeds it back to the other two members at the end of each card.

All members have an opportunity to be teacher, pupil, and observer. Sequences may start out with three or four numbers and be patterns which are commonly found in the classroom, i.e., 4-8-2. The number of categories on each card increases and progresses to sequences less commonly found, i.e., 4-9-9-7-1-1-2.

Skill is developed in both producing and controlling one's behavior, as well as in observing and tallying.

Variation of Twenty Questions

Purpose: To develop skill in utilizing various types of questions, to determine when which types are appropriate, and to note the effects on pupil participation. When used: Midway to late in the semester, after students are aware of the Ashner-Gallagher system of categorizing questions and levels of thinking, which are listed below:

A *cognitive memory* question asks for recall of a fact.

A *convergent* question requires putting together or integrating facts.

A *divergent* question calls for imaginative answers in which respondents bring in their own data.

An *evaluative* question calls for a judgment.

Each student teacher is requested to write on a slip of paper a cognitive memory question. An example is given the group of taking such a question, which requires a narrow, specific, factual reply, and showing how this question can be changed so that it solicits different types of responses. The group learns that a cognitive memory question such as:

> "According to the Flanders system, what is tallied under category 4? 5?"

can elicit a convergent response when changed to:

> "How is it possible in the same lesson to be more direct in the I/D ratio and more indirect in the revised i/d ratio?"

while it evokes a divergent response when reworded as:

> "What revisions can you suggest for making Flanders' categories 4 and 5 more meaningful?"

and results in an evaluative response when changed to:

> "Do you think taking 4's and 5's out of the I/D ratio is really meaningful?"

Working in buzz groups, each cognitive memory question which was composed by the student teachers is considered one at a time in an attempt to try to restate it so as to ask a convergent, a divergent, and an evaluative question instead.

As this skill session progresses, the student teachers begin to see that what happens in terms of the length and type of student participation is largely dependent on the nature of the thinking evoked by the teachers' questions. This skill session requires a good deal of thinking by the student teachers on the divergent level!

Wanna Buy a Pen?

Purpose: To develop insight into the effect on communication of using a concentration of direct behaviors as opposed to indirect behaviors. When used: When students can produce selected behaviors at will and are ready to examine the effects of their behaviors on others. This comes about midway through the term.

Groups of three are formed. Two members of the group receive slips of paper with directions about a particular role they are to take. These two members are to interact, keeping the instructions they were given in mind. The third member is to observe the interaction and determine what follows.

The instructions passed out to the group members follow:

Salesman 1: You are trying to sell a pen. In your sales talk use only categories 4, 5, 6, and 7.

Client 1: A salesman is trying to sell something to you. React in whatever way he makes you feel inclined to.

Observer 1: Note the interaction of the salesman and the client. What behaviors does he use? What is their effect on the client?

After about five or six minutes, the following instructions are passed out on slips of paper.

Salesman 2: You are trying to sell a pen. In your sales talk use only categories 1, 2, 3, (+ 4?).

Client 2: A salesman is trying to sell something to you. React in whatever way he makes you feel inclined to.

Observer 2: Note the interaction of the salesman and the client. What behaviors does he use? What is their effect on the client?

The same person continues to observe, but the two who are role playing may reverse roles, with the client becoming the salesman, etc.

After five minutes of practicing these behaviors, the total group holds a discussion, with the observers from each group reporting their perceptions of how the behavior of the salesmen affected that of the clients. For the most part the same things occur in all of the groups: In Condition I, the client becomes more and more resistant as the salesman appears to be more and more pressured in his behaviors. In Condition II, the clients are much more pliant, as they do not feel pressured by the accepting behaviors used by the salesman.

These perceptions are checked out by having the "clients" in each group tell how they were feeling. Comparisons are made between these situations and the effects of similar behaviors when used by teachers in the classroom. Attention is given to the effect of many narrow questions on students and the possibility that such questions may be creating negative feelings similar to those observed in the clients in Condition I.

Implications for teaching are drawn from the various insights gained through the discussion, with emphasis upon the idea of building a relationship in the classroom which reduces feelings of pressure, annoyance, and even hostility among pupils.

The After-School Blues (Variation of Wanna Buy a Pen?)

This skill session is conducted in the same way as Wanna Buy a Pen? and is used as an alternate to it. The slips of paper which are distributed in this skill session read as follows:

Teacher 1:	You are a teacher. You have kept a boy after school for talking. He is now reporting for detention. Talk to him about the detention. Use only categories 4, 5, 6, 7.
Pupil 1:	You are a pupil. You have been kept after school for talking. You feel you are being detained unfairly because many others were talking. However, you do know you were talking, and you know this was wrong. You are now reporting for detention.

Your first words might be, "I'm here for detention, but I don't think it is fair." Your job is to note your feelings as the teacher talks with you.

Observer 1: You are to act as observer to the dialogue. You are to observe for about five minutes, noting the teacher and pupil behaviors. You are also to act as judge: the teacher is to use only categories 4, 5, 6, and 7. If the teacher uses categories other than these too many times, stop the dialogue and point out your observations. After the dialogue has run approximately five minutes, call time.

The second set of directions reads as follows:

Teacher 2: You are in the same situation as before, only this time use only categories 1, 2, 3, and 4.

Pupil 2: You are in the same situation as before; note your feelings about the teacher this time.

Observer 2: Same instructions as before, only this time the teacher is to use only categories 1, 2, 3, and 4.

The same type of discussion follows this session, with the focus being on how to establish rapport in communicating with students on a one-to-one level. The normal after-school discipline session consists of preaching to the student, telling him what he should do, and perhaps a little pep talk telling him he can do better.

Sensitivity into the dynamics of reaching hard-to-reach youngsters can be achieved as those who role played the discipline problem-child speak their minds about how they reacted to the conferences. The implications are for classroom teaching as well.

Dear Abby (Variation of Wanna Buy a Pen?)

The same directions apply to this skill session as to Wanna Buy a Pen? and to The After-School Blues. Only one of the three is used, as they all serve the same purpose. The roles which are passed out for this skill session read as follows:

Person 1: Your friend has a problem. You'd like to help. Find out all that you can about this problem using only 4's, 5's, 6's, and 7's.

Person 2: You have a problem. Your friend is trying to help. You are reluctant to tell him the problem, but you might be persuaded to talk about it.

The second part of the role-playing consists of following these directions:

> After the above is completed, try the situation again. This time Person 1 is to use only categories 1, 2, 3, and 4. What were the differences between the two situations?

What makes for open or closed communication, getting people to communicate as opposed to withdrawing or feeling negative emotions, come out of the discussion of these sessions.

Onsie, Twosie

Purpose: For the student teachers to (1) experience what it feels like to be a slow learner, (2) remember how it feels when the teacher refuses to clarify an ambiguous assignment, and (3) get a taste of being taught under one-way and two-way communication. When used: Early in the term. This demonstration is also suitable at almost any time when the subject of the effects of teacher behavior and the communication process are appropriate.

One person in the class is asked to be the experimentor or the teacher. All of the members of the class are instructed to take out two pieces of paper. The experimentor is given a sheet of paper on which six rectangles are drawn, which touch one another at various points. The experimentor is to describe the drawing before him. The class is to attempt to follow his instructions so that they will have the same diagram that the experimentor has when the instructions have been followed.

The experimentor is to turn his back to the class while giving the directions. The class is not allowed to ask any questions or to make any sounds at all, so that no feedback is received by the experimentor. When the experimentor completes the directions, the instructor silently notes how long the procedure took. The class members fill out forms indicating how many of the six rectangles they believe they placed accurately in their diagrams, and how they felt during this part of the experiment. The experimentor is asked to record how he felt during this experiment also.

A second diagram, also containing six rectangles, is given to the experimentor. Class members take the second sheet of paper on which they are to attempt to reproduce the diagram which the experimentor will now communicate. This time the experimentor is to fact the class as he describes the diagram, and the class may ask whatever questions they have.

When the experimentor concludes, the class once again records how many rectangles they believe they placed together correctly, how they felt during Condition 2, and also how long they believe the first set of directions and the second set each took. The experimentor records how he felt the second time and also estimates the time element in the two conditions.

The two diagrams are placed on the blackboard, and the students determine how many rectangles were correctly placed in the two conditions. Data are collected on the blackboard for Conditions 1 and 2, to determine the Confidence Scores (how many rectangles each person thought he had placed correctly in the two conditions), the Accuracy Scores (how many actually were correct), and how the class felt during the two conditions. The perceptions of the experimentor are also noted. A discussion of the data follows. As a rule, the students have higher confidence and much higher accuracy scores the second time, although the second experiment takes longer. The perceptions of the time involved vary. Often the group does not realize the degree of the time differential between the two experiments because of being more involved in the second condition.

The emotions of frustration and give-up-itus experienced in Condition 1 parallel how students feel in ambiguous situations and in classrooms with one-way communication. The frrustration may be transfered to the experimentor in Condition 2 when he must go over the same thing a number of times and becomes aware of the fact that he is not communicating adequately. The discussion includes the concept of communication as a process of emitting responses which are received and then fed back to the communicator. The moral of the experiment is that two-way communication may take longer, but the students will achieve more and feel better about it. One-way communication may be easier for the teacher, but not as productive in terms of the goals of learning. Another message from this experiment is the importance of the teacher's listening to the cues of pupils to establish a more meaningful vocabulary for communicating.

Rules of the Game

Purpose: To draw dramatic attention to the unwritten ground rules observed in the classroom game, as analyzed and reported by Arno Bellack.

When used: Late in the term as an introduction to the study of Arno Bellack. This is a period when concepts from researchers other than Flanders are studied.

The instructor arrives in class early and hands out to those students who also come early a number of directions to be carried out during the class. Each direction on the cards is designed to break one of the Rules of Bellack's Classroom Game. Examples of the directions which are to be followed are:

1. Praise another student's idea directly.
2. Give the instructor a direction.
3. Praise and criticize the instructor personally.
4. Order another student to do something.
5. Keep telling the instructor you do not understand something, that she is not explaining it well.

The class begins as usual. As the instructor proceeds with the material at hand, from time to time the students who hold a specific direction are to subtly produce the behaviors on their cards. As the lesson continues, the class begins to notice that some of their classmates are behaving atypically. Whispers, buzzing, noise, and laughter result as the various students pursue the use of these unusual behaviors.

The piece de resistance comes when a student gets up and goes to the blackboard, stating that this seems like a good time to summarize the lesson. At this point, there may be out-and-out chaos with students asking, "What's going on?"

A discussion follows in which the students are asked what they saw happen. They begin to note that the normal, expected, adhered to but unwritten rules of classroom behavior of students have been broken. Points brought out in the discussion are:

1. What happens when these rules are broken?
2. Do they like these rules?
3. Is there anything wrong with these rules?
4. If they do not like these rules, which would they want to change?
5. How would they change them?

Other Rules of the Game revealed by Bellack are brought up for discussion. Thereafter, some of the student teachers, on their own, are found to experiment in their own classrooms by trying to change one of these rules; or they attempt at future meetings to break a rule which they feel should be amended. The results of their experimenting usually end up being quite humorous.

Round Robin

Purpose: To learn the categories in the Flanders system and to begin to think in terms of labeling a statement with a category number. When used: Very early in the semester when the Flanders categories are first introduced.

The first part of this skill session focuses on learning to associate an appropriate number from the Flanders system to the description of the category for which it stands. Each person, as he feels so moved, calls out a description of a category, such as "silence," and the group responds with the correct number, in this case, "10." Practice continues until group members respond quickly and seem to be making the connections quite well.

The procedure is then reversed in the second stage of this session. Numbers are called out at random and the group responds with the correct description of the category. In this case, a student might say, "Four," and the group would respond with, "Asks questions."

The third step is to ask each student to write a couple of statements which he feels very clearly illustrate any of the categories. These statements are given individually and the group attempts to classify them. Discussion and debate usually follow, as some of the statements present categories which require judgment in classifying them.

A fourth step is to request that each student write a statement or a dialogue representing the use of two categories in sequence. The same procedure follows with the group, rather than just individuals, doing the responding.

This skill session affords a logical and sequential introduction to categorizing and permits success for most of the learners.

Is Our Class First-Class?

Purpose: To get the student teachers to view their own seminar as a classroom in which interaction is also taking place and to examine it as such; to gain experience in live classroom tallying which is less difficult than tallying from tapes. When used: Early in the term when tallying is introduced.

The class is divided in half. One half of the class interacts with the instructor while the other half observes and tallies the interaction using the Flanders system. After a brief period of perhaps four minutes, the groups four minutes, the groups reverse roles. The discussion which is being tallied can concern itself with the categories and the problems the student teachers just had as they were tallying. The roles can be reversed several times during the period, increasing the length of the tallying slightly each time.

It is important to suggest to the class that the interaction not be too fast, so that this first taste of live tallying is not a frustrating one. The instructor monitors his own behavior, attempting to use behaviors which are not difficult to categorize and not changing from category to category too rapidly.

It is helpful to tape-record this and other class meetings. The tape can be replayed so that problem areas can be gone over together, and so that you are not left guessing about the precise dialogue to which the students are referring.

The Broken Record or In a Rut

Purpose: To produce skill in monitoring one's behavior for periods of time. When used: Early approaching midway through the semester when emphasis is on producing categories.

The students should be seated in a circle for this skill session. Students are instructed to take out a sheet of paper. The instructor asks the students to count from one to nine; when nine is reached, the next student begins with one again.

Each student records his number in large enough figures to be read by the other students in the class.

The class members are then instructed to hold the paper in front of themselves, with the numbers facing the class, and to interact with typical teacher and pupil behaviors, limiting their participation to the use of the category that they hold in front of them. After three to four minutes of interaction, the students are asked to pass their numbers to the person to their right, and the interaction continues; after about three minutes, the students are again instructed to pass their numbers to the right.

It becomes readily apparent that the person with a "seven" requires the least amount of effort to participate frequently. As the session continues, different members have the desire to possess specific categories. The spontaneous yet limiting interaction can lead to a great deal of humor in this skill session.

Interaction Crossword Puzzles, or Who Needs the New York Times?

Purpose: To give student teachers skill in producing many different combinations of behaviors, in observing behaviors accurately, and in noting their locations on the matrix. To provide a humorous variation from other skill sessions which attempt to have them produce categories. When used: Early to midway in the term after the student teachers can discriminate categories quite well.

The instructor has a matrix containing cells which have been shaded in to form a picture. The numbers of each cell which make up the picture are copied onto separate slips of paper. The slips of paper are distributed among the students, with each student receiving several slips. The students are told to write a segment of classroom dialogue for each of the slips so that the two categories on each slip are very clearly illustrated. They are then to exchange these dialogues with someone and categorize the dialogues of that person. Any bits of dialogue in which the person makes an error in categorizing are changed, so that the dialogues will not be difficult or tricky to tally.

All students are given a blank matrix. Each student then reads aloud the dialogues based on his slips of paper, utilizing a partner for help when more than one person's voice is needed in the interaction, i.e., an exchange of interaction between a student and the teacher or between two students. As each dialogue is enacted, the students shade in on the blank matrix before them the cell which has been demonstrated. The students are not to call out the cells but to shade the matrix in, thinking through the categories by themselves. When all of the dialogues representing the cells indicated on the slips of paper have been presented before the group, the students should have the completed picture before them on their matrix, hopefully done correctly.

One way to prevent students from giving a dialogue which is intended to represent one particular cell but which is actually that of a different cell is to have the students prepare the dialogues as an assignment and for the instructor to go over them before they are given in the class to eliminate errors. The sketches on the matrix can be humorous, and the students can be invited to submit one for use. Some figures which have been used are faces, a sailboat, animals, flowers.

Model, Model on the Wall

Purpose: To get the student teacher to think through how ideal lessons might look on a matrix and to afford practice in analyzing matrices. When used: After matrix interpretation is understood and several matrices have been thoroughly analyzed.

The student teachers go into small groups with others who teach the same content area. Each is instructed to shade in areas and cells of several matrices which they would consider to be ideal lessons of a specific nature for their particular academic discipline. Examples of such types of lessons might be an introductory lesson to a new concept, a review lesson, a discussion lesson, or a discovery lesson.

The model matrices are then strung along the walls and the blackboard with each group's set of matrices being placed together as a grouping. The student teachers examine the various groups of matrices and try to determine what content area was being taught, i.e., English, social studies, science, etc., and what type of lessons they are intended to depict.

In this way, the students may discover that a model discovery lesson or review lesson may look very similar on a matrix, regardless of the content area. They may also find that they cannot discern which content area was hypothetically being taught.

Variation of Model, Model on the Wall

Purpose: To afford practice analyzing the matrices of typical classroom lessons. When used: After matrix interpretation is understood and several matrices have been analyzed.

The student teachers are placed into buzz groups. One at a time, four different types of matrices are given to the members of each group. The group is to analyze what type of a lesson this matrix seems to represent and to baptize the nameless matrix. In so doing they analyze areas of the matrix, cells, column totals. Matrices which typify a discovery lesson, a review and reinforcement lesson, aversive stimulation, and a lecture with discussion are examples of lessons which can be used. The group receives only one matrix at a time and does not get another until they feel they have thoroughly analyzed the one they are working on and are ready for the next.

Twenty Questions or Because

Purpose: (a) To promote understanding of the relationship between the type of response the teacher solicits, the nature of the response pupils give, and how the teacher reacts to pupil response; (bO To afford practice in the skill of informing pupils why what they have said or done is not publicly acceptable. When used: After Marie Hughes' concept of public criteria has been studied. Midway to late in the term.

Buzz groups are formed. As two members interact at a time, one as the teacher, and the other as the pupil, the others observe. The "teacher" is to ask questions and no matter what the "pupil" responds, the teacher is to give extensive praise, extensive use of the student's idea, or a combination of these two behaviors.

Because the questions chosen to be asked are frequently narrow, requiring very predictable responses, the student teachers begin to complain that there is something phony and meaningless about teachers reacting with praise and use of students' ideas to a response such as, "Harrisburg is the capital of Pennsylvania." "Yes, Johnny, that is absolutely correct; Harrisburg is our state capital," seems to lead nowhere. This discovery, however, leads to an analysis of the nature of the questions being asked by the teacher.

At this point the student teachers switch their attention to asking questions which evoke more thoughtful replies and unpredictable responses:

Teacher: "How do you think it might affect our city if Philadelphia were suddenly made the capital of the United States?

Pupil: We would have to beautify our city much more."

Teacher: "Yes, the appearance of our city would be even more important than it is now, since the eyes of the world would then be on us."

As they practice asking broader questions, the student teachers find that they can give more meaningful and earnest praise and acceptance of the pupils' replies. Then the student teachers can focus more readily on giving public criteria, or telling the pupil why his idea is good and acceptable or even why it is not.

No Tickee, No Speakee

Purpose: To focus in on the amount of participation of different group members. To help equalize participation in the group by making the highly verbal consciously control when they speak so that they do not run out of turns to speak and encourage the less verbal to get in and speak up. When used: When the issue of unequal participation in the group is apparent.

Each person in the group is told to take out a certain number of slips of paper, such as five, and place them before him. The Students should be sitting in a circle, facing one another. A class discussion ensues about any pertinent topic at hand. As each person participates in the discussion, he forfeits a slip of paper. When all of his tickets to participate have been used up, a student may no longer talk, but must sit in silence.

The discussion might very well concern communication, participation by group members, how the students feel about this form of control over their participation, what is happening in the group as a result of the ground rules for talking. The students seem to enjoy this skill session, especially as the most verbal either use up their talking privileges or begin to painfully refrain from talking. Also new voices begin to be heard and even listened to.

Cell-Mates

Purpose: To introduce to student teachers reading a matric and to get them to produce a large variety of combinations of behaviors. When used: Early in the term when matrix reading is first introduced.

A large matrix is placed in front of the class. This may either be drawn on the blackboard or sketched on large poster board. The instructor points to a cell on the matrix. The students are expected, orally, to produce the categories represented by each cell that is pointed to, by providing a dialogue which would be classified in that cell. So that if the instructor points to the 4-5 cell, a student teacher might respond, "Do any of you know what language is spoken in Brazil? That language is also spoken by a small country on the Iberian peninsula."

This session goes especially well when it can be conducted at an accelerated pace.

Stop the Music (Variation of The Broken Record or In a Rut

Purpose: To produce skill in monitoring one's behavior for periods of time. When used: Early, approaching midway through the semester when stress is on producing categories.

Seven students are chosen, each representing a category number from one to seven in the Flanders system. The number is written on a slip of paper and held before the student teacher for all to see. The instructor teaches the class as he normally does or else he role plays a teacher of a non-college class. A student from the class may do the role playing of the teacher, if so desired. At certain points in the interaction, the teacher stops. Each of the students holding numbers responds one at a time with an appropriate statement which the teacher might make at that point, using the category number to which he is restricted.

A discussion can follow at any point as to which responses are most appropriate at these times. There is a potential for humor arising in this skill session as the student teachers attempt to produce the appropriate behaviors. It also becomes apparent that the teacher is not restricted to A behavior, but to multiple ones with which to react to the same situation if he so chooses.

How'm I Doin'?

Purpose: To get the benefits of immediate feedback concerning one's behavior as it relates of group interaction. When used: Midway to late in the semester when the student teachers are open to receiving feedback.

One half of the group sits in a circle. The other half takes seats outside of those in the circle, with one person sitting behind each of those in the circle. The inner circle interacts by holding a group discussion, while each one in the outer circle observes the interaction, focusing particular attention on the person sitting in front of him. The discussion continues for six minutrs, after which those who were observing give feedback about their perceptions of the role each is playing to the particular person each was observing. The feedback session lasts about three to four minutes (?) and then the group interacts for another six minutes, after which they receive feedback once again. The procedure may be repeated once more.

The groups then change places, with the outer circle becoming the inner circle and giving feedback to those who were observers before on their respective roles in the group communication process.

The Hostility Hypothesis

Purpose: To develop insight into the negative effects typically used behaviors have in stress situations and the more desirable results which follow when behaviors are used which reduce hostility. When used: Midway to toward the end of the semester. When student teachers can analyze subtleties of behaviors and their resulting effects.

A role playing situation is set up in which two people are interacting, one of whom is quite angry and upset at something which has happened.

Typical situations which can be used are: (1) a parent who is upset because his child was treated unfairly by a teacher comes to school to speak to the teacher; (2) a principal asks a teacher to give up her two free periods for lunch duty in order to relieve another teacher; (3) a pupil who feels he is always being picked on has just been in a fight with another pupil and the teacher is talking it over with the "underdog."

The class observes the interaction of the conference in which the person who is upset gets more and more upset. The role playing is cut and the class discusses what behaviors were used by the "superior" and what effect such behaviors had. The tendency is for the superior to give instructions or advice on what the troubled person should say, feel, and do, and to explain or justify the behavior of the opposition. These behaviors tend to incite the upset person more so, and as his hostility rises, be becomes less and less rational and stops listening altogether.

During the class discussion, alternate behaviors are suggested for handling such situations more effectively. These are then role played either by the same people or by those offering the suggestion.

APPENDIX B

MATERIALS USED IN EXPERIMENTAL COURSES

MATERIAL: WEEKS 4 AND 5 (I.A.)

In groups of three:

1. Take turns pointing to cells of the matrix and producing the appropriate behaviors (don't name them---do them!), e.g.,

point to: 5

6

"Open your books."
"Today we will study about the Civil War."

or:

"Look at the chart on the side board."
"It tells us about tin in Bolivia."

2. One "play" student, one "play" teacher, and one "play" observer. Take turns producing the following patterns. Try to make different examples of each pattern; e.g., for 4-8-2 you might have:

T: How much is 2 and 2?
S: 8
T: Good try.

or:

T: What is the adverb in sentence four?
S: Slowly.
T: You certainly did your homework!

Try making up sequences for each other to produce. Don't be too rough---like 1-7, or 5-8:

4	4	4	4	5	6	6	4	4	5
8	9	4	4	5	6	6	8	8	5
2	2	8	9	6	5	7	4	3	4
		8	9	4	5	6	8	4	9
		(or more)				7	4	8	9
		2	3				8	2	1
		3	2				2		2
			3						

3. Make believe that you are in the following situations:

a) A friend is obviously upset. You'd like to help, but you don't know what is bothering him. Try to find out, using only 5's, 6's, and 7's (okay, try a few 4's), and then try using only 1's, 2's, and 3's (with a few 4's). What happened? Check your perceptions with both the "friend" and the "observer."

b) Try to sell your friend your fountain pen (or anything else you have around), using only 4's. What happens? Do different 4's produce different results?

c) Pick a controversial subject (Vietnam, religion, etc.); take a different side from your friend's viewpoint. (1) Discuss it with him. (2) Now make sure you use a 3 before you say anything.

MAKE UP OTHER SITUATIONS---HAVE FUN!

MATERIAL: WEEK 6 (I.A.)

Sample Teaching Patterns

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MATERIAL: WEEK 6 (I.A.)

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For Thursday's Labs:

1. Build a matrix.
2. Compute I/D ratio.
3. Compute i/d ratio.
4. Compute percentage of teacher talk, student talk, silence/confusion.

---

5. "Look" at other areas discussed in class.

This is a small but representative sample of a social studies lesson which had as its objective "to have the students clarify their understanding of the reasons why the Articles of Confederation failed." The method to be employed was listed as "discussion."

Pretend the matrix was given to you as feedback for yourself. Be ready to discuss in lab:

a. Did you do what you expected to do?

b. What areas might you wish to change?

MATERIAL: WEEK 7 (I.A.)

TEACHER NO. 1

Mathematics, 6th grade, introduction

	1	2	3	4	5	6	7	8	9	10	Tot
1											0
2			1	2		1	1				5
3			2	1	2			1			6
4			1	2		1	1	24	2	6	37
5				4	36	4		2		4	50
6				1	4	3	1	11		10	30
7				1		4	1	1			7
8		5	2	16	5	6	3	48		4	89
9						2					2
10				10	3	9		2		178	202
Tot.	0	5	6	37	50	30	7	89	2	202	420

MATERIAL: WEEK 8 (I.A.)

TEACHER NO. 2

Mathematics, 6th grade, introduction

	1	2	3	4	5	6	7	8	9	10	Tot
1				3	1				1		5
2		2	4	8	4	2		1	7		28
3	1	3	15	5	4			2	7		37
4		5	2	17	11			29	15	2	81
5	1		2	20	54	2		2	5	3	89
6		1		1	3			1	1		7
7											0
8	1	7	10	12	2	1		31		3	67
9	2	10	4	12	10	2			84	9	133
10				3				1	13	6	23
Tot.	5	28	37	81	89	7	0	67	133	23	470

MATERIAL: WEEKS 10-13 (I.A.)

Praise as reinforcement used in a drill pattern		Content presentation with clarification of student understanding level		Concept development using student ideas to build a concept	
Without corrective feedback	With corrective feedback	With acceptance of feeling	Without acceptance of feeling	With silence for thought	Without silence for thought
5	5	5	5	5	5
5	5	5	5	5	5
4	5	5	5	5	5
6	4	5	5	4	4
8	8	1	5	4	4
2	2	5	5	8	8
4	4	4	4	8	8
8	8	9	9	3	3
4	7	9	9	4	4
8	3	5	3	8	8
2	8	5	5	3	3
6	2	4	4	5	4
8	4	4	4	5	9
8	8	9	9	4	9
2	2	9	5	4	3
5	4	5	5	10	9
5	8	5	5	10	9
	5	1	5	9	3
	4	5	5	3	5
	8	5	5	9	5
	2			3	
	5			5	

Interaction Analysis Role Playing Example

Teacher 1

You are a teacher. You have kept a boy after school for talking. He is now reporting for detention. Talk to him about the detention. Use only categories 4, 5, 6, 7.

Pupil 1

You are a pupil. You have been kept after school for talking. You feel you are being detained unfairly because many others were talking. However, you do know you were talking, and you know this was wrong. You are now reporting for detention. Your first words might be, "I'm here for detention, but I don't think it is fair." Your job is to note your feelings as the teacher talks to you.

Observer 1

You are to act as observer to the dialogue. You are to observe for about five minutes, noting the teacher and pupil behaviors. You are also to act as judge: the teacher is to use only categories 4, 5, 6, and 7. If the teacher uses categories other than these too many times, stop the dialogue. After the dialogue has run approximately five minutes, call time.

Teacher 2

You are in the same situation as before, only this time use only categories 1, 2, 3, and 4.

Pupil 2

You are in the same situation as before; note your feelings about the teacher this time.

Observer 2

Same instructions as before, only this time the teacher is to use only categories 1, 2, 3, and 4.

MATERIALS: WEEK 4 (L.T.)

DATA SHEET FOR LABORATORY WORK

Name ______________________________ Date ______________

Laboratory Section __________ Experimental Group __________

In experiments number 1, 2, and 3 a word or symbol is considered as learned when said correctly in order and repeated correctly each time until the entire list is learned. (Both conditions must be met. If a word is said correctly and in order the second time but missed the third time and said correctly the fourth time and each time thereafter, the word is considered to have been learned on the fourth, not the second trial.)

In the space provided below, record the words for experiments 1, 2, and 3 and the trial on which each word was learned for your subject. Do the same thing for the other members of your experimental group. Record also the trial on which mastery of the entire list was achieved.

EXPERIMENT

Trials

	Your Subject	Other Members of Your Experimental Group							Mean

EXPERIMENT #3

	TRIALS									
	1	2	3	4	5	6	7	8	9	10
1. HAIR										
2. EYES										
3. NOSE										
4. MOUTH										
5. CHIN										
6. NECK										
7. SHOULDER										
8. CHEST										

EXPERIMENT #4

	TRIALS	
	1	2
1. BAT - (3)		
2. PET - (2)		
3. LOG - (2)		
4. SUN - (3)		
5. TEA - (1)		
6. RED - (2)		
7. JUG - (1)		
8. COW - (1)		
9. MOP - (3)		

LABORATORY WORK SHEET #3

Secondary Education 6

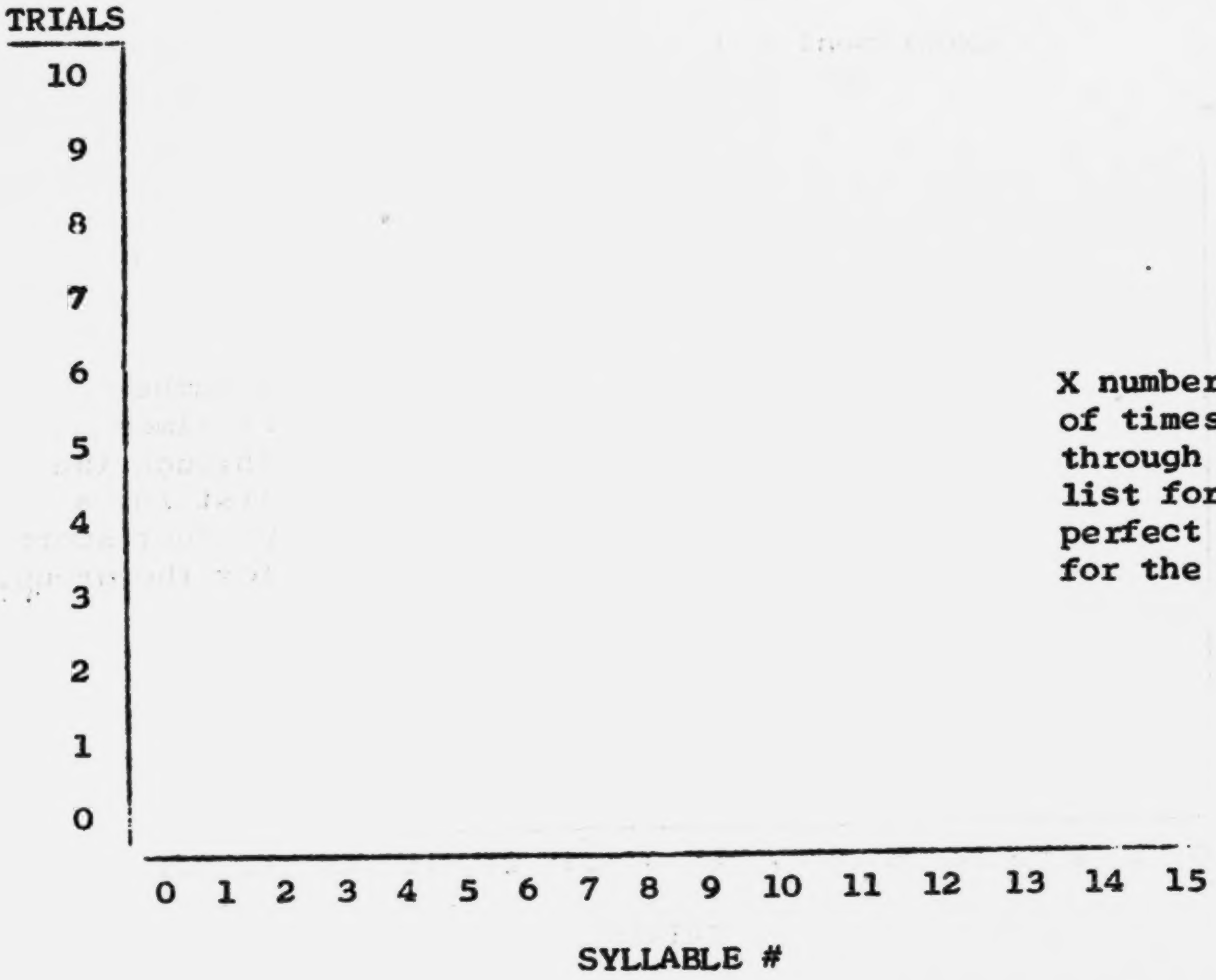
Name ______________________________ Date ____________________

Laboratory Section ________________ Lecture Section _________

Experimental Group ________________ (Write here A or B)

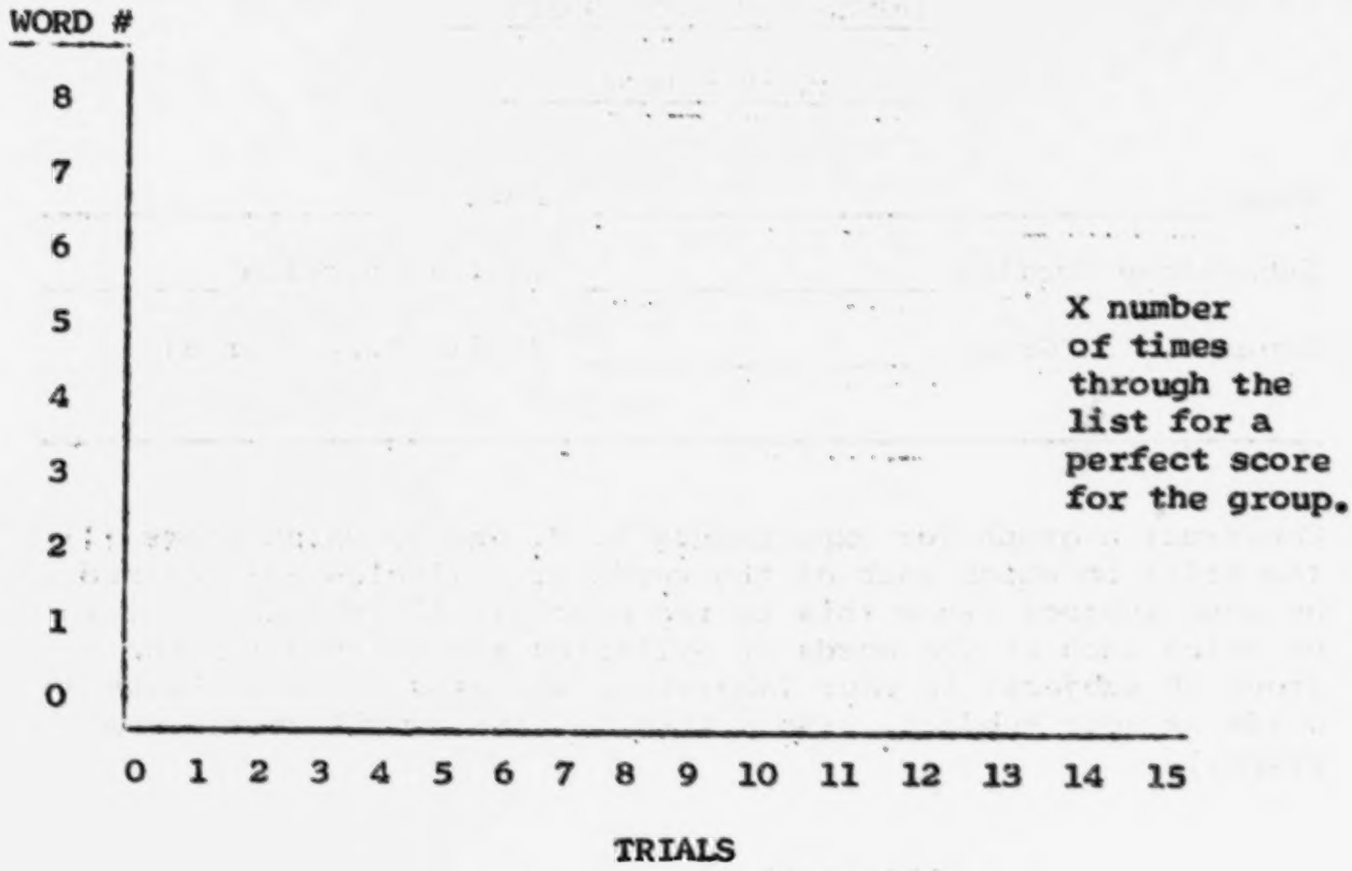
Construct a graph for experiments 1, 2, and 3, which shows (1) the trial on which each of the words or syllables was learned by your subject (show this in red pencil), (2) the mean trial on which each of the words or syllables was learned for the group of subjects in your laboratory who used the same lists of words as your subject. (Show this in blue pencil on the same graph.)

Experiment #1



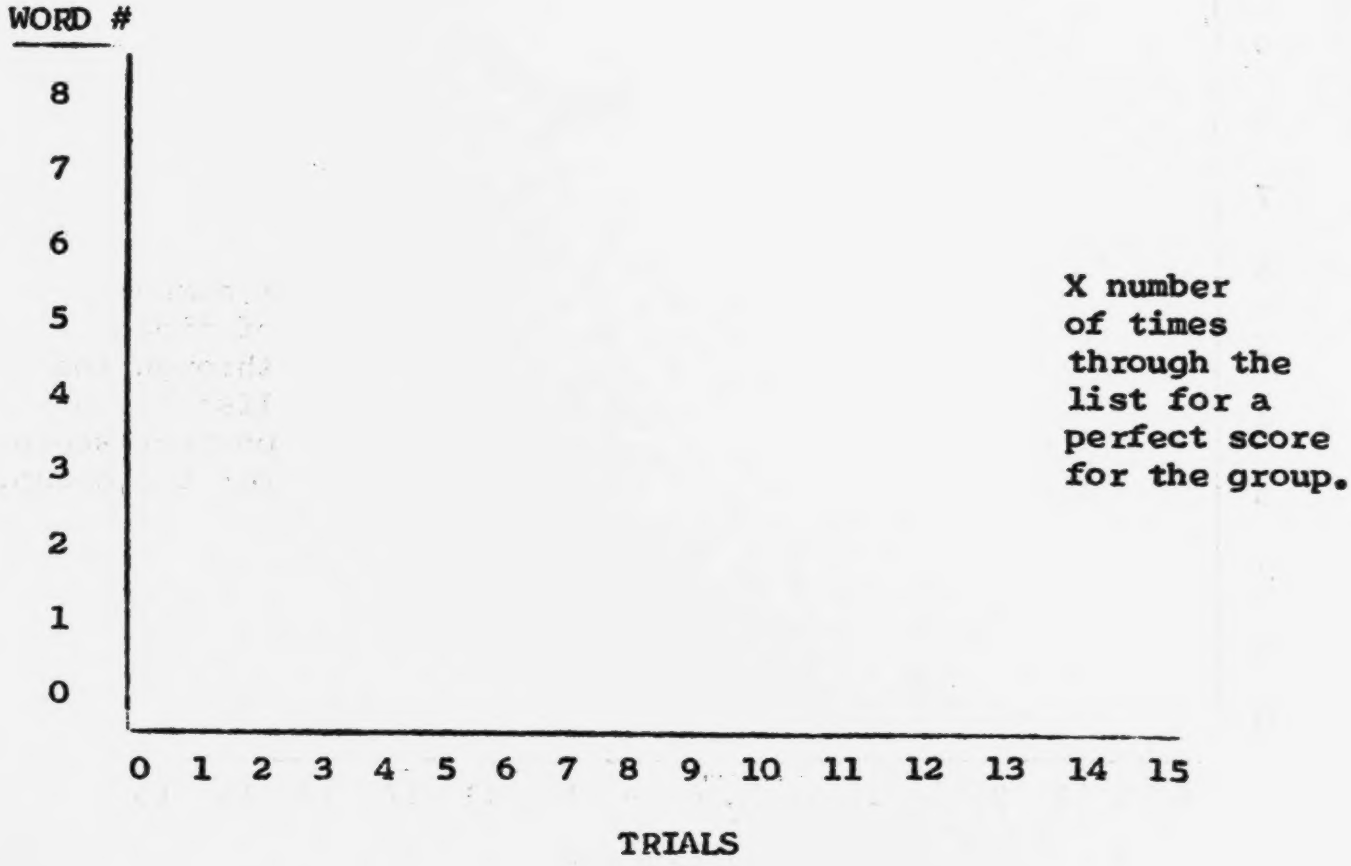
X number of times through the list for a perfect score for the group.

Experiment #2



X number
of times
through the
list for a
perfect score
for the group.

Experiment # 3



X number
of times
through the
list for a
perfect score
for the group.

MATERIALS: WEEKS 2, 14, and 15 (L.T.)

Research Report

Research question and hypothesis

Design

Procedures

Measures

Subjects (N =)

Major conclusions

Your comments

Research Project

61B

______________________________ ______________

Your name Date

____

Your laboratory instructor's name

Statement of the problem you studied (Why did you pick this problem, why was it of interest, and what did you hope to learn from it?)

HYPOTHESIS (one clear sentence)

Page 2

Description of the Sample (Describe or list all of the characteristics of the sample which are relevant to your particular study. For example, if you were studying the differences in the way boys and girls react to threats, you would want to report the sex of your sample students. However, if you were studying the differences between a modified and advanced placement group's reaction to threats, you might not separate boys' responses from girls' responses, and therefore might not be interested in the sex ratio of the sample):

Design and Procedure (What did you do and how did you do it? draw a picture, if possible.):

Measuring Instruments (Describe the instrument, why you selected or created it. Include a discussion of its advantages and disadvantages--things you would change if you were to use the instrument again. If you wish, you may include a copy of the instrument--questionnaire, achievement test, etc.):

Findings and Results (When possible, present your findings in a table or graph. Summarize whenever possible. However, be sure to present all necessary data to justify whatever conclusions you draw.):

Conclusions, Implications for Your Own Teaching, and Implications for Other Teachers or Classes (Discuss in detail what you learned from this study, how this study will affect your teaching in the future, and how you think this study indicates the teaching of others might be improved. Be very specific.):

Critique of the Study---Strengths and Weaknesses (If you were going to do it all over again, what things about the study would you keep the same? Why? What things about the study would you change? How and why?):

APPENDIX C

INDIVIDUAL TEACHER DATA AND SUMMARY MATRICES

1966 SPRING POST

LT-LT

	1	2	3	4	5	6	7	8	9	10	Tot.
1	.08	.02	.02	.06	.06	.01	0.00	0.00	.04	.01	.29
2	.03	.12	1.07	.79	.55	.16	.04	.19	1.04	.23	4.22
3	.04	.97	1.43	1.78	1.61	.15	.11	.07	1.82	.40	8.36
4	.02	.12	.25	2.06	.38	.24	.16	3.81	4.37	.94	12.35
5	.04	.31	.05	2.96	14.16	.53	.24	.28	1.80	1.03	21.39
6	.04	.02	.03	.47	3.01	.75	.05	.60	.75	.55	6.28
7	0.00	.04	.06	.50	.28	.36	1.01	.11	.61	.31	3.29
8	.01	.87	1.85	.99	.45	.19	.27	5.27	.20	.75	10.84
9	.05	1.56	2.09	2.05	1.97	.40	.95	.07	8.60	3.05	20.79
10	0.00	.18	.10	1.10	1.16	.43	.39	.60	3.34	4.86	12.16
Tot.	.29	4.22	6.94	12.77	23.64	3.21	3.23	10.99	22.56	12.13	

1966 SPRING POST

IA-LT

	1	2	3	4	5	6	7	8	9	10	Tot.
1	.22	.02	.07	.09	.12	0.00	.01	0.00	.06	.02	.61
2	.05	.21	1.10	.71	.49	.11	.04	.16	1.24	.15	4.25
3	.05	.82	2.28	1.79	1.92	.23	.11	.11	.68	.33	8.32
4	.01	.14	.04	2.69	.35	.26	.09	4.04	3.36	1.36	12.35
5	.06	.33	.21	2.90	18.71	.66	.29	.23	1.10	1.50	26.00
6	0.00	.02	.02	.25	.32	1.33	.14	.64	.61	.85	4.18
7	.02	.06	.02	.27	.24	.43	.52	.14	.34	.51	2.55
8	.01	1.00	1.72	1.11	.67	.11	.26	3.45	.24	.74	9.32
9	.14	1.38	2.59	1.35	1.80	.31	.56	.03	8.56	2.52	19.24
10	.05	.27	.27	1.20	1.37	.73	.53	.53	3.03	5.17	13.16
Tot.	.61	4.26	8.32	12.35	26.00	4.17	2.55	9.33	19.23	13.16	

1966 SPRING POST

LT

	1	2	3	4	5	6	7	8	9	10	Tot
1	.06	.02	.01	.05	.06	.01	0.00	0.00	.02	.01	.22
2	.03	.11	1.14	.86	.65	.15	.04	.20	.98	.28	4.42
3	.02	.74	1.28	1.87	1.74	.12	.09	.10	1.01	.33	7.27
4	.01	.10	.16	2.84	.44	.27	.14	4.33	4.45	.92	13.65
5	.03	.35	.09	3.48	18.90	.56	.20	.22	1.52	.88	26.22
6	.03	.05	.02	.39	1.69	.64	.08	.69	.63	.51	4.69
7	.01	.04	.04	.44	.30	.34	.80	.09	.50	.27	2.82
8	.01	1.21	1.93	1.03	.54	.32	.24	5.99	.20	.53	11.98
9	.04	1.62	1.81	1.92	1.84	.36	.84	.06	9.03	2.14	19.65
10	.01	.18	.11	.98	1.20	.42	.36	.41	2.21	3.24	9.09
Tot.	.22	4.42	6.56	13.86	27.35	3.16	2.79	12.06	20.53	9.08	

1966 SPRING POST

IA

	1	2	3	4	5	6	7	8	9	10	Tot
1	.14	.01	.04	.06	.09	.01	.02	.01	.06	.03	.44
2	.05	.19	1.30	.64	.46	.11	.05	.16	1.28	.27	4.49
3	.03	.77	2.50	1.67	2.07	.14	.07	.11	.67	.45	8.45
4	.01	.11	.05	2.67	.56	.23	.06	4.01	2.94	1.20	11.83
5	.07	.49	.27	3.08	20.60	.57	.25	.17	1.16	1.43	28.08
6	.01	.02	.02	.28	.28	1.00	.14	.50	.55	.65	3.42
7	.01	.07	.02	.22	.25	.38	.57	.12	.30	.53	2.45
8	.01	1.05	1.79	.89	.67	.14	.18	3.72	.28	.90	9.63
9	.09	1.47	2.23	1.22	1.64	.29	.55	.05	8.48	2.19	18.17
10	.05	.33	.25	1.13	1.49	.57	.59	.80	2.46	5.44	13.07
Tot.	.44	4.49	8.45	11.83	28.08	3.42	2.45	9.63	18.17	13.07	

1966 SPRING POST

IA-IA

	1	2	3	4	5	6	7	8	9	10	Tot
1	.05	0.00	.01	.03	.05	.02	.02	.01	.05	.03	.26
2	.04	.17	1.50	.57	.42	.11	.06	.16	1.31	.38	4.72
3	0.00	.71	2.72	1.54	3.31	.05	.02	.10	.66	.57	8.58
4	0.00	.08	.05	2.64	.76	.20	.03	3.98	2.52	1.04	11.30
5	.07	.65	.32	3.26	22.49	.48	.20	.11	1.22	1.35	30.16
6	.01	.02	.01	.30	.23	.66	.14	.36	.49	.45	2.66
7	0.00	.08	.02	.16	.25	.32	.62	.10	.26	.54	2.35
8	.01	1.09	1.86	.66	.67	.17	.10	3.99	.32	1.05	9.93
9	.04	1.55	1.87	1.08	1.47	.26	.53	.06	8.39	1.86	17.10
10	.04	.38	.22	1.05	1.61	.40	.64	1.06	1.88	5.70	12.97
Tot.	.26	4.72	8.58	11.30	30.16	2.66	2.35	9.93	17.10	12.97	

1966 FALL POST

LT-LT

	1	2	3	4	5	6	7	8	9	10	Tot.
1	.01	0.00	0.00	0.00	0.00	0.00	0.00	.02	0.00	0.00	.03
2	0.00	.04	.92	.74	.54	.18	0.00	.14	.60	.09	3.26
3	0.00	.47	.62	2.19	1.94	.17	.10	.10	.40	.17	6.15
4	0.00	.03	.02	2.07	.17	.16	.01	6.18	2.23	.63	11.51
5	0.00	.23	.23	3.42	31.58	.75	.19	.24	1.16	.45	38.23
6	0.00	0.00	.02	.41	.30	1.24	.13	1.18	.40	.63	4.32
7	.01	.02	.05	.19	.33	.19	.54	.11	.15	.11	1.70
8	.01	1.70	2.90	1.09	1.04	.56	.20	8.18	.20	.55	16.43
9	0.00	.70	1.32	.81	1.71	.32	.30	.02	3.85	1.26	10.28
10	0.00	.07	.09	.58	.64	.75	.22	.26	1.29	4.22	8.11
Tot.	.03	3.26	6.15	11.51	38.23	4.32	1.70	16.43	10.28	8.11	

1966 SPRING POST

LT-IA

	1	2	3	4	5	6	7	8	9	10	Tot.
1	.03	.02	0.00	.04	.05	0.00	0.00	0.00	0.00	0.00	.14
2	.02	.10	1.20	.93	.74	.13	.04	.20	.92	.33	4.61
3	0.00	.51	1.12	1.96	1.86	.09	.07	.12	.19	.25	6.18
4	0.00	.08	.07	3.62	.50	.29	.12	4.84	4.53	.89	14.94
5	.02	.39	.12	4.00	23.64	.58	.16	.16	1.24	.73	31.05
6	.01	.07	0.00	.30	.36	.52	.11	.77	.50	.46	3.10
7	.01	.04	.02	.38	.32	.32	.58	.07	.38	.23	2.35
8	.01	1.54	2.01	1.06	.63	.44	.21	6.71	.20	.30	13.12
9	.03	1.68	1.52	1.79	1.71	.32	.72	.04	9.46	1.22	18.50
10	.01	.18	.12	.86	1.23	.41	.33	.21	1.07	1.61	6.02
Tot	.14	4.61	6.18	14.94	31.05	3.10	2.35	13.12	18.50	6.02	

1966 FALL POST

IA-LT

	1	2	3	4	5	6	7	8	9	10	Tot.
1	.15	.01	0.00	.03	.02	.01	.01	0.00	.07	.01	.31
2	.02	.25	1.86	.81	.61	.04	.04	.14	1.30	.44	5.50
3	0.00	.57	1.20	2.49	1.92	.11	.04	.14	1.14	.39	8.00
4	.02	.11	.08	2.13	.30	.09	.10	4.00	3.70	.98	11.51
5	.04	.21	.15	2.59	11.65	.16	.11	.10	1.35	.70	17.05
6	0.00	.02	.01	.16	.14	.16	.05	.26	.39	.21	1.39
7	.01	.05	.01	.16	.05	.08	1.72	0.00	.60	.16	2.85
8	.01	1.82	1.50	.66	.25	.12	.04	4.86	.15	.67	10.09
9	.05	2.21	3.03	1.34	1.25	.33	.49	.04	14.94	3.80	27.47
10	.01	.26	.16	1.13	.87	.31	.23	.55	3.83	8.46	8.46
Tot.	.31	5.50	8.00	11.51	17.05	1.39	2.85	10.09	27.47	15.83	

1966 FALL POST

LT-IA

	1	2	3	4	5	6	7	8	9	10	Tot.
1	0.00	0.00	0.00	0.00	.02	0.00	0.00	0.00	.03	0.00	.05
2	.02	.07	.40	.46	.55	.02	.03	.17	1.26	.29	3.26
3	0.00	.67	1.01	1.24	1.42	.05	.05	.06	.18	.22	4.89
4	0.00	.02	.02	4.06	.18	.02	.05	6.28	1.76	.71	13.10
5	.02	.54	.12	3.62	27.32	.72	.26	.18	1.45	.83	35.03
6	0.00	.01	0.00	.28	.38	.49	.09	.18	.22	.36	2.00
7	0.00	.02	.02	.11	.26	.08	.53	.06	.13	.28	1.49
8	0.00	1.05	2.26	1.81	1.35	.09	.10	8.82	.11	1.49	17.08
9	.02	.65	1.06	.60	2.58	.22	.10	.01	5.33	.54	11.11
10	0.00	.24	.02	.92	.98	.32	.28	1.33	.63	7.27	11.98
Tot.	.05	3.26	4.89	13.10	35.02	2.00	1.49	17.08	11.11	11.99	

1966 FALL POST

IA-IA

	1	2	3	4	5	6	7	8	9	10	Tot.
1	.03	.01	0.00	0.00	.03	0.00	0.00	0.00	.01	0.00	.08
2	0.00	.26	.88	.64	.74	.06	0.00	.39	1.21	.45	4.64
3	0.00	.67	1.38	1.59	2.08	.01	.02	.17	.23	.24	6.41
4	0.00	.30	.03	2.99	.27	.12	.04	5.61	1.76	1.04	12.15
5	.02	.63	.11	3.64	29.21	.44	.12	.23	1.20	.64	36.22
6	0.00	.03	0.00	.13	.26	.43	.07	.36	.17	.32	1.77
7	0.00	.03	.01	.07	.09	.07	.19	.02	.04	.25	.77
8	0.00	1.37	2.53	1.46	1.11	.18	.03	10.40	.13	.38	17.58
9	.03	1.04	1.44	.66	1.47	.08	.06	.03	5.01	.70	10.51
10	.01	.29	.05	.98	.96	.38	.24	.38	.73	5.86	9.87
Tot.	.08	4.63	6.41	12.15	36.22	1.77	.77	17.59	10.51	9.87	

FALL, 1966

Student	Group	TSRT Post	D-Scale Post	Pupil Opinion 1-4Post	Pupil Opinion 5-7Post	Rater Post
01	1	11[illegible]	[illegible]57	[illegible]367	141[illegible]1	0[illegible]9
02	1	104	293	2967	16032	066
03	1	105	215	2960	14700	078
04	1	096	156	3462	16230	031
06	1	104	212	3166	17777	048
07	1	103	250	3316	16894	035
08	1	118	274	2636	15151	086
09	1	103	211	3250	18556	036
10	1	101	222	2826	17652	075
01	2	116	262	2931	16443	023
02	2	110	261	3379	15689	064
03	2	106	183	2885	15384	026
04	2	113	212	2567	15666	058
05	2	106	195	3428	18750	023
06	2	099	285	2750	14875	062
08	2	099	224	3363	18727	023
09	2	096	205	3264	18411	027
10	2	105	275	3000	16611	035
01	3	095	234	3121	16454	060
02	3	098	142	1870	13391	091
03	3	093	231	3413	16777	034
04	3	114	282	3028	14828	097
06	3	104	262	3090	16424	041
07	3	100	232	2652	13347	098
08	3	105	260	3078	15684	053
09	3	116	247	2462	15884	067
10	3	104	210	2844	16125	082
01	4	098	257	3200	17520	074
03	4	103	176	3545	18242	047
04	4	102	212	2100	14050	046
05	4	094	086	2866	15333	021
06	4	097	170	3343	16500	070
07	4	097	208	2800	14800	047
08	4	108	226	2548	15709	087
09	4	104	242	2227	14409	093
10	4	088	192	3286	17178	031

SPRING, 1966

Student	Group	TSRT Post	D-Scale Post	Pupil Opinion 1-4Post	Pupil Opinion 5-7Post	Rater Post
01	1	098	200	2857	15428	072
02	1	085	167	3466	19933	052
03	1	100	223	3333	16285	060
04	1	094	245	2431	15724	073
05	1	105	224	2578	15657	056
06	1	109	188	2258	12548	049
07	1	098	222	2107	13535	060
08	1	102	162	3485	19971	069
09	1	089	151	2588	15911	056
10	1	101	197	3275	17448	067
11	1	111	263	3240	18400	067
12	1	103	238	1575	14600	062
13	1	096	264	2259	13843	057
01	2	090	155	2416	15583	044
03	2	088	204	3371	18000	048
04	2	081	208	2484	14196	084
05	2	081	183	2681	14409	051
06	2	094	168	3400	18600	038
07	2	072	190	3368	17210	052
08	2	073	273	3200	16266	072
09	2	058	218	2906	15781	073
10	2	101	230	3193	17354	051
11	2	073	199	3181	17045	085
12	2	075	282	2333	13722	041
13	2	103	247	3461	17307	060
14	2	072	196	2645	14967	049
01	3	092	132	3361	17944	070
03	3	102	279	2857	17142	046
04	3	086	207	2869	15652	
05	3	128	268	3240	14520	
06	3	082	200	3000	15305	
07	3	108	272	2812	12937	
08	3	080	185	2241	13413	
09	3	071	184	3000	15546	
10	3	099	281	2965	15482	
11	3	110	254	3400	20333	
12	3	081	207	2600	13733	
13	3	102	236	2531	15125	
14	3	109	230	2958	16625	
01	4	103	183	2944	16194	
02	4	114	258	3320	21120	
03	4	093	185	3205	16705	
04	4	108	189	2833	13444	
05	4	098	240	2421	15368	
06	4	105	224	2785	13821	
07	4	096	148	3206	18344	
08	4	102	230	2242	14060	
09	4	097	222	3190	15904	
10	4	102	229	2045	15363	
11	4	086	198	3692	16923	
12	4	090	209	2875	15291	
13	4	088	188	2428	15142	

FALL, 1966

Student	Group	TSRT Post	D-Scale Post	Pupil Opinion 1-4Post	Pupil Opinion 5-7Post	Rater Post
01	1	106	151	2758	14150	95
02	1	104	169	3238	16619	
03	1	101	257	3185	16474	64
04	1	092	247	2087	16435	
05	1	103	175	3520	16480	82
06	1	078	203	3080	16240	48
07	1	093	200	2857	14714	69
08	1	072	232	3407	17444	55
09	1	072	202	3050	14650	81
10	1	078	227	2885	15514	45
11	1	072	178	3000	15150	48
12	1	084	245	3500	19333	39
13	1	094	174	3350	16450	
01	2	097	209	3129	15613	65
02	2	088	202	2875	15792	77
03	2	096	191	3059	17529	42
04	2	076	243	3710	18903	
06	2	096	224	3172	16966	
07	2	070	168	3471	16647	44
08	2	105	264	3318	16000	43
09	2	102	197	3424	15667	72
10	2	101	222	3259	18963	
11	2	107	215	3333	16636	64
12	2	115	263	2917	14542	54
01	3	103	220			49
02	3	083	193	3054	16486	46
03	3	093	218	3444	19611	
04	3	094	213	2893	16461	74
05	3	112	261	3484	16710	78
06	3	069	182	2869	16869	64
07	3		198	2541	13486	64
08	3	104	238	3676	17432	59
09	3	091	216	2125	13000	87
11	3	103	234	1111	10222	110
01	4	102	191	3174	16304	49
02	4	112	262	2500	12000	56
03	4	091	280			
04	4	109	194	2333	15381	80
05	4	089	226	2444	15277	43
06	4	083	214	2778	15778	77
07	4	095	205	3278	16944	81
08	4	093	191	3394	16818	81
09	4	079	244	2947	17263	43
10	4	087	204	3000	16125	43
11	4	069	192	2773	14000	53

FIRST SEMESTER

INDIVIDUAL TEACHER MATRICES

```
1    101

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .61    .20    .82    .41    .31   0.00    .31    .31    .20   3.16
0.00   0.00   1.12   1.43   1.02    .41    .31    .41    .41    .20   5.31
0.00    .10    .10   4.08    .92    .61    .10  10.82   1.84   2.04  20.61
0.00    .10   0.00   3.06  12.65    .41    .71   0.00    .92    .61  18.47
0.00   0.00   0.00    .71    .41   1.12    .20   3.78    .41    .71   7.35
0.00   0.00    .10    .82    .82   1.12   2.04    .10    .31    .82   6.12
0.00   1.85   2.76   6.02    .92    .92   1.02   5.92    .41   2.24  22.04
0.00    .51    .92   1.33    .51    .20    .71    .20   1.43    .41   6.22
0.00   0.00    .20   2.35    .82   2.24   1.02    .51    .10   3.47  10.71
0.00   3.16   5.41  20.61  18.47   7.35   6.12  22.04   6.12  10.71
```

```
1     102

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    1.07     .95     .36    0.00    0.00     .24     .12    0.00    2.74
0.00     .36    4.65    4.30    2.39    0.00     .24     .12     .60     .12   12.77
0.00    0.00    0.00    8.00    1.07    1.31     .24   13.01     .60    1.67   25.89
0.00    0.00    0.00    3.94   17.90     .48     .12     .48     .60     .48   23.99
0.00    0.00    0.00     .48     .12     .24     .12    3.34     .24     .36    4.89
0.00    0.00     .12     .60     .48     .24     .24     .24    0.00     .12    2.03
0.00    2.27    5.61    6.92     .84    1.19     .72    3.70    0.00    0.00   21.24
0.00     .12    1.31    0.00     .36     .12     .36    0.00     .84    0.00    3.10
0.00    0.00    0.00     .72     .48    1.31    0.00     .12     .12     .60    3.34
0.00    2.74   12.77   25.89   23.99    4.89    2.03   21.24    3.10    3.34
```

1 103

.59	.07	.07	.07	.15	0.00	0.00	0.00	.15	0.00	1.10
0.00	.22	1.18	.29	.59	0.00	0.00	.44	5.59	.29	8.61
.15	.44	1.62	.81	1.69	0.00	0.00	0.00	.66	0.00	5.37
0.00	.66	.15	1.18	.44	0.00	0.00	.74	1.77	.22	5.15
.29	1.84	.15	1.18	26.12	.07	0.00	0.00	2.94	0.00	32.60
0.00	0.00	0.00	0.00	.07	.07	0.00	0.00	.07	0.00	.22
0.00	0.00	0.00	0.00	0.00	0.00	.07	0.00	.15	0.00	.22
0.00	.29	.44	.15	.15	0.00	0.00	.81	.22	.07	2.13
.07	5.08	1.77	1.25	3.02	0.00	.15	.07	24.14	4.12	39.66
0.00	0.00	0.00	.22	.37	.07	0.00	.07	3.97	.22	4.93
1.10	8.61	5.37	5.15	32.60	.22	.22	2.13	39.66	4.93	

```
1     104

  .21    0.00    0.00     .07      29    0.00    0.00    0.00    0.00    0.00     .57
  .07     .36    1.36     .43      71    0.00     .07     .14    1.57     .29    5.00
  .07     .64    1.71    2.00    3.00    0.00    0.00    0.00     .43     .07    7.93
 0.00     .86    0.00    2.50      21      07     .07    2.43    4.00     .64   10.79
  .07      21     .14    4.30   46.64     .07    0.00    0.00    1.71     .29   53.50
 0.00    0.00    0.00    0.00    0.00      07    0.00     .14     .07    0.00     .29
 0.00    0.00    0.00     .07      36    0.00    0.00    0.00     .21    0.00     .64
 0.00     .36    1.29     .50     .21      07     .07     .29     .14     .14    3.07
  .14    2.36    3.43      57    1.79    0.00     .43     .07    6.43     .71   15.93
 0.00     .21    0.00     .29      29    0.00    0.00    0.00    1.36     .14    2.29
  .57    5.00    7.93   10.79   53.50      29     .64    3.07   15.93    2.29
```

1	106									
.96	35	0.00	17	52	0.00	0.00	0.00	.09	.09	2.19
09	17	1.05	.70	.87	0.00	0.00	.26	4.37	.44	7.96
.09	.44	4.37	.35	84	09	0.00	0.00	.35	0.00	7.52
.09	1.31	.09	1.05	.17	.09	0.00	.70	1.49	.17	5.16
.61	.96	.44	1.49	27.91	26	.09	.09	1.05	.26	33.16
0.00	0.00	0.00	0.00	0.00	.61	0.00	.35	.09	.09	1.14
0.00	0.00	0.00	0.00	.09	0.00	0.00	0.00	.09	0.00	.17
0.00	.44	.44	.17	0.00	0.00	0.00	3.94	.35	.09	5.42
.35	4.11	1.14	1.14	1.31	0.00	.09	.09	26.33	.79	35.35
0.00	.17	0.00	.09	.44	.09	0.00	0.00	1.14	0.00	1.92
2.19	7.96	7.52	5.16	33.16	1.14	.17	5.42	35.35	1.92	

```
1     107

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   3.19   2.13    .95   0.00    .12    .47   0.00   0.00   6.86
0.00    .83    .95   2.01   2.25    .12   0.00   0.00   0.00   0.00   6.15
0.00   0.00   0.00   8.98     24    .12   0.00   8.27   2.84    .95  21.39
0.00   0.00   0.00   4.37  22.34    .24   0.00   0.00    .59    .24  27.78
0.00   0.00   0.00    .24    .12    .47   0.00    .47    .24    .12   1.65
0.00   0.00   0.00    .12    .12   0.00   0.00   0.00   0.00   0.00    .24
0.00   5.44   1.77   1.30    .59     24   0.00  15.01   0.00   0.00  24.35
0.00    .59    .12   1.54    .95     35    .12   0.00   6.38   0.00  10.05
0.00   0.00    .12    .71    .24     12   0.00    .12   0.00    .24   1.54
0.00   6.86   6.15  21.39  27.78   1.65    .24  24.35  10.05   1.54
```

1 105

0.00	0.00	0.00	0.00	.12	0.00	0.00	0.00	0.00	0.00	12
0.00	0.00	2.20	.49	24	0.00	0.00	.37	.24	0.00	3.55
0.00	37	.61	2.94	2.94	0.00	0.00	0.00	0.00	0.00	6.85
0.00	0.00	0.00	2.45	0.00	49	12	5.63	4.53	.12	13.34
0.00	.12	0.00	3.92	28.80	1.71	24	0.00	.12	.37	45.29
.12	.12	0.00	.73	61	4.53	49	.12	.12	1.10	7.96
0.00	12	0.00	.51	24	0.00	1 22	0.00	0.00	0.00	2.20
0.00	1.96	3.43	61	0.00	0.00	0.00	3.67	0.00	.12	9.79
0.00	.86	.61	1.35	1.71	37	.12	0.00	3.55	0.00	8.57
0.00	0.00	0.00	.24	61	86	0.00	0.00	0.00	.61	2.33
12	3.55	6.85	13.34	45 29	7.96	2.20	9.79	8.57	2.33	

```
1     109

0.00    .12    0.00     .36     .12    0.00    0.00    0.00    0.00    0.00     .60
0.00    .12     .71     .60    0 00     .12    0.00     .48    2.14     .12    4.29
 .24   1.19    2.38    4.40    1.07     12      .24     .95    1.07    0.00   11.67
0.00    .36     .24    3.45     .24     36     0.00    6.67    3.33     .83   15.48
0.00   0.00    0.00    1.31    4.64     .24     .24    0.00     .24     .60    7.26
0.00   0.00    0.00    0.00     .12    0.00    0.00     .60     .48     .12    1.31
0.00    .12    0.00     .12     .12     .12     .12    0.00     .12     .12     .83
 .12    .83    4.29    2.62     .24    0.00    0.00   13.93     .95     .60   23.57
 .12   1.43    3.93    1.79     .48     24      .12     .60   21.90     .36   30.95
 .12    .12     .12     .83     .24     .12     .12     .36     .71    1.31     4.05
 .60   4.29   11.67   15.48    7.26    1.31     .83   23.57   30.95    4.05
```

1 110

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	4.14	2.18	.92	0.00	0.00	0.00	0.00	0.00	7.24
0.00	.11	.46	2.64	2.41	.11	0.00	0.00	0.00	0.00	5.75
0.00	0.00	0.00	3.22	0.00	0.00	0.00	6.78	7.59	.92	18.51
0.00	0.00	0.00	6.90	22.30	.11	0.00	.11	0.00	.34	29.77
0.00	0.00	0.00	.57	0.00	1.03	0.00	0.00	0.00	0.00	1.61
0.00	0.00	0.00	.34	11	0.00	0.00	0.00	0.00	0.00	.46
0.00	5.17	1.03	.46	23	11	0.00	3.33	0.00	0.00	10.34
0.00	1.95	.11	2.07	3.22	.11	.34	0.00	16.55	.23	24.60
0.00	0.00	0.00	.11	.57	.11	.11	.11	.46	.23	1.72
0.00	7.24	5.75	18.51	29.77	1.61	.46	10.34	24.60	1.72	

1 201

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	.22	1.83	.54	.32	0.00	0.00	1.40	1.18	.43	5.92
0.00	1.40	1.94	3.44	1.72	.32	.22	.11	.11	.75	10.01
0.00	.43	0.00	4.20	1.40	1.61	0.00	5.81	1.51	1.61	16.58
0.00	.32	.32	3.66	9.36	1.40	.65	.43	.54	2.91	19.59
0.00	0.00	0.00	1.29	.65	86	.43	.65	.32	1.83	6.03
0.00	.32	0.00	.54	.75	.11	.22	.11	.32	1.83	4.20
0.00	1.83	4.63	.97	.54	.22	.54	2.37	0.00	.65	11.73
0.00	.86	.97	.54	1.51	.11	.65	0.00	2.05	.65	7.32
0.00	.54	.32	1.40	3.34	1.40	1.51	.86	1.29	7.97	18.62
0.00	5.92	10.01	16.58	19.59	6.03	4.20	11.73	7.32	18.62	

```
1    202

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .48    .96    .36    .84   0.00   0.00    .84   2.29    .36   6.14
0.00    .72   5.90   3.01   2.41    .24    .24    .36   1.20    .12  14.20
0.00    .12   0.00   2.77    .24   0.00    .12   4.69   2.17   1.44  11.55
0.00    .60    .12   2.77  22.86   0.00   0.00    .12   2.89   1.08  30.45
0.00   0.00   0.00   0.00    .24   0.00   0.00   0.00   0.00   0.00    .24
0.00    .12    .12    .24    .24   0.00    .36    .12    .60    .24   2.05
0.00   1.32   2.41    .96    .72   0.00    .36   1.93    .12    .36   8.18
0.00   2.05   4.45    .60   1.08   0.00    .96   0.00   9.87   1.68  20.70
0.00    .72    .24    .84   1.81   0.00   0.00    .12   1.56   1.20   6.50
0.00   6.14  14.20  11.55  30.45     24   2.05   8.18  20.70   6.50
```

```
1     203

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .56    .56   1.79   1.45    .11    .11   0.00    .34   1.01   5.93
0.00    .45   0.00    .89    .67   0.00   0.00   0.00    .22   0.00   2.24
0.00    .11   0.00   3.24   1.79    .89    .11   5.15   3.13   1.34  15.77
0.00    .34    .22   3.69  12.08    .67    .22    .67   2.24   1.01  21.14
0.00   0.00   0.00   1.68    .11    .67    .11    .45    .11    .22   3.36
0.00   0.00   0.00    .45   0.00   0.00    .11   0.00    .11    .34   1.01
0.00   1.34    .89   1.90   1.57    .22   0.00  14.88    .11    .34  21.25
0.00   2.91    .56    .89   2.57   0.00    .22   0.00  12.86    .34  20.36
0.00    .22   0.00   1.23    .89    .78    .11    .11   1.23   4.36   8.95
0.00   5.93   2.24  15.77  21.14   3.36   1.01  21.25  20.36   8.95
```

```
1     204

0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
0.00     0.00     4.79     2.75      .84     0.00     0.00     0.00     0.00     0.00     8.38
0.00      .12     3.23     2.28     2.75      .12     0.00      .12     0.00     0.00     8.62
0.00     0.00     0.00     6.59     0.00     0.00     0.00     6.83     5.15      .48    19.04
0.00     0.00     0.00     4.19    19.88      .60     0.00     0.00     0.00      .24    24.91
0.00      .12     0.00      .60      .48      .72     0.00      .12     0.00     0.00     2.04
0.00     0.00     0.00      .36      .24     0.00     0.00     0.00      .24     0.00      .84
0.00     5.87      .12      .60     0.00      .36     0.00     8.26     0.00      .12    15.33
0.00     2.28      .48     1.44      .36      .12      .72     0.00    14.61     0.00    20.00
0.00     0.00     0.00      .24      .36      .12      .12     0.00     0.00     0.00      .84
0.00     8.38     8.62    19.04    24.91     2.04      .84    15.33    20.00      .84
```

```
1    205

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .34   1.38   1.83    .69    .11   0.00    .46   1.61   0.00   6.42
0.00    .92   1.95   5.62   2.18    .11    .11    .23    .11    .11  11.35
0.00    .11    .23    5.50   .80    .34   0.00  10.21   3.33   1.72  22.25
0.00   1.26    .11   4.01  13.30    .69    .11    .11    .80    .23  20.64
0.00    .11   0.00   0.00    .46    .69   0.00    .80    .11    .80   2.98
0.00    .11    .11    .23    .46   0.00    .11    .34   0.00    .23   1.61
0.00   2.18   4.70   2.75    .92    .46    .46   4.24    .46    .57  16.74
0.00   1.26   2.75   1.38    .34    .11    .46    .11   5.50    .23  12.16
0.00    .11    .11   1.03   1.38    .46    .34    .23    .23   1.95   5.85
0.00   6.42  11.35  22.36  20.53   2.98   1.61  16.74  12.16   5.85
```

1 206

0.00	0.00	0.00	0.00	.07	0.00	0.00	0.00	0.00	0.00	.07
0.00	.41	.75	.21	.62	0.00	0.00	0.00	.89	.41	3.29
0.00	0.00	.27	.48	.96	0.00	0.00	0.00	.27	.14	2.12
0.00	.07	0.00	1.10	1.37	.34	0.00	.89	3.76	.75	8.28
0.00	.21	.14	2.53	24.78	.82	.75	0.00	2.94	1.85	34.02
0.00	.07	0.00	.34	.68	.62	0.00	.62	.21	.62	3.15
0.00	0.00	0.00	.07	.62	0.00	1.30	.07	.14	.48	2.67
0.00	.27	0.00	.41	.14	.21	.14	2.19	.14	.27	3.76
.07	2.05	.89	1.92	2.74	.55	.21	0.00	13.55	.68	22.66
0.00	.21	.07	1.23	2.05	.62	.27	0.00	.75	14.78	19.99
.07	3.29	2.12	8.28	34.02	3.15	2.67	3.67	22.66	19.99	

```
1     208

0.00    0.00    0.00     .12    0.00    0.00    0.00    0.00    0.00    0.00      .12
0.00     .36    1.55    1.43     .36     .12    0.00    1.31    1.31     .24     6.67
0.00     .36    1.07    5.36    2.14     .12     .12     .36     .36     .71    10.60
0.00    0.00    0.00    4.05     .24     .36     .12   11.31    2.26     .95    19.29
0.00     .36     .12    2.50    3.69    0.00    0.00     .12     .60     .12     7.50
0.00    0.00    0.00     .12     .12     .36    0.00     .60    0.00    0.00     1.19
0.00    0.00    0.00     .60    0.00    0.00    0.00     .12    0.00    0.00      .71
 .12    3.21    6.31    2.86     .60     .12     .48   21.31     .60     .12    35.71
0.00    2.38    1.55     .48     .12    0.00    0.00     .48   10.60     .12    15.71
0.00    0.00    0.00    1.79     .24     .12    0.00     .12    0.00     .24     2.50
 .12    6.67   10.60   19.29    7.50    1.19     .71   35.71   15.71    2.50
```

```
1     209

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00     .22    1.20    1.20    1.75     .11    0.00    0.00     .55     .44    5.47
0.00     .66    0.00    1.75    2.84    0.00     .11    0.00    2.19     .11    7.66
0.00     .11    0.00    4.27    2.30     .11     .33    5.25    4.49    1.31   18.16
0.00     .55     .22    7.00   16.41     .22     .33    0.00    2.08    1,75   28.56
0.00    0.00    0.00     .11     .22     .33    0.00    0.00     .11     .22     .98
0.00    0.00    0.00     .22     .55    0.00     .22     .11     .22     .22    1.53
0.00    1.31    2.41    1.09     .44    0.00    0.00    1.31     .22    0.00    6.78
0.00    2.30    3.83    1.53    1.97     .22     .22    0.00    9.96     .11   20.13
0.00     .33    0.00     .98    2.08    0.00     .33     .11     .33    6.56   10.72
0.00    5.47    7.66   18.16   28.56     .98    1.53    6.78   20.13   10.72
```

```
1     210

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00    .22    .32    .11   0.00   0.00    .22    .54   0.00   1.41
0.00   0.00    .43    .54   1.84   0.00   0.00   0.00    .1     .11   3.03
0.00    .11   0.00   6.71    .54   0.00   0.00   3.35   1.19   1.73  13.64
0.00    .43    .22   2.81  56.39    .11   0.00   0.00    .54    .54  61.04
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00    .11    .11
0.00   0.00   0.00   0.00    .11   0.00   0.00   0.00    .11   0.00    .22
0.00    .11   1.52    .76    .54   0.00   0.00   2.49    .22    .54   6.17
0.00    .54    .43    .87    .65   0.00    .22   0.00   4.55    .32   7.58
0.00    .22    .22   1.62    .87   0.00   0.00    .11    .32   3.46   6.82
0.00   1.41   3.03  13.64  61.04    .11    .22   6.17   7.58   6.82
```

```
1     301

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   1.87   0.00   1.99    .47   0.00   0.00    .58    .70    .35   5.96
0.00    .23    .58    .47    .23   0.00   0.00   0.00   0.00    .12   1.64
0.00    .35   0.00  12.50    .58   0.00    .12   4.79   2.10   3.50  23.95
0.00   0.00   0.00   3.50  24.30   0.00    .35    .12    .12    .70  29.09
0.00   0.00   0.00   0.00   0.00   0.00   0.00    .12   0.00   0.00    .12
0.00   0.00   0.00    .12    .23   0.00   1.52    .12   0.00    .82   2.80
0.00   1.40    .70   1.40   1.40    .12    .23   7.01    .12    .70  13.08
0.00   1.05    .35    .93    .82   0 00   0.00   0.00   6.43    .12   9.70
0.00   1.05   0.00   3.04   1.05   0.00    .58    .35    .23   7.36  13.67
0.00   5.96   1.64  23.95  29.09    .12   2.80  13.08   9.70  13.67
```

1 302

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	.66	1.57	1.05	0.00	0.00	.13	0.00	.26	3.67
0.00	1.18	.39	2.10	1.05	.13	0.00	.13	0.00	0.00	4.98
0.00	0.00	0.00	11.53	.66	13	.13	9.57	.92	2.23	25.16
0.00	0.00	0.00	3.41	21.10	.13	.13	.13	.26	1.70	26.87
0.00	0.00	0.00	.13	.26	.26	0.00	.13	0.00	.13	.92
0.00	0.00	.13	.66	.13	0.00	1.70	.26	0.00	1.18	4.06
0.00	2.36	3.80	2.88	.26	0.00	.92	3.54	.13	.52	14.42
0.00	0.00	0.00	.52	.26	0.00	.26	0.00	.92	.39	2.36
0.00	.13	0.00	2.36	2.10	.26	.92	.52	.13	11.14	17.56
0.00	3.67	4.98	25.16	26.87	.92	4.06	14.42	2.36	17.56	

```
1    303

0.00   0.00   0.00    .12    .24   0.00   0.00   0.00   0.00   0.00    .36
 .12   0.00    .83    .71    .36    .12   0.00   0.00    .12   0.00   2.26
0.00    .36    .12    .71   1.31    .12   0.00    .12    .83   0.00   3.57
0.00   0.00   0.00   3.93    .60    .71   0.00    .12   5.24   1.19  11.79
 .24   0.00    .12   3.45  40.95   1.43    .36   0.00   1.31    .36  48.21
0.00   0.00   0.00    .24   1.31    .48   0.00    .60    .36   0.00   2.98
0.00   0.00   0.00   0.00    .36   0.00   0.00   0.00   0.00    .12    .48
0.00    .24    .36   0.00    .24   0.00   0.00   4.05   0.00   0.00   4.88
0.00   1.67   2.02   2.38   2.02   0.00    .12   0.00  14.64    .36  23.21
0.00   0.00    .12    .24    .83    .12   0.00   0.00    .71    .24   2.26
 .36   2.26   3.57  11.79  48.21   2.98    .48   4.88  23.21   2.26
```

```
1     304

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   3.49   1.01    .56   0.00   0.00   0.00   0.00   0.00   5.07
0.00    .45   1.24   1.35   3.15   0.00   0.00   0.00   0.00    .11   6.31
0.00   0.00   0.00   5.07   0.00   0.00   0.00   7.09   3.49   1.24  16.89
0.00   0.00   0.00   4.95  43.69    .23   0.00   0.00   0.00    .11  48.99
0.00   0.00   0.00    .68    .11   1.24    .11    .11    .11    .11   2.48
0.00   0.00   0.00   1.24    .23    .11   0.00   0.00   0.00   0.00   1.58
0.00   4.05   1.46   1.01    .11    .11    .45   4.05   0.00   0.00  11.26
0.00    .56    .11    .79    .79    .45   1.01   0.00   1.91   0.00   5.63
0.00   0.00   0.00    .79    .34    .34   0.00   0.00    .11    .23   1.80
0.00   5.07   6.31  16.89  48.99   2.48   1.58  11.26   5.63   1.80
```

```
1     306

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00     .19    0.00     .37    0.00    0.00    0.00     .09     .65
0.00    0.00    0.00     .19     .19     .28    0.00     .09     .09     .09     .94
0.00    0.00    0.00     .94     .19     .94     .19    2.34     .75    1.68    7.02
0.00    0.00    0.00    1.12    5.71    2.15     .09    0.00     .28    2.43   11.79
0.00    0.00    0.00     .28    2.43    6.55     .47    1.31     .37    7.39   18.80
0.00    0.00    0.00    0.00    0.00     .47     .65     .19     .19     .65    2.15
0.00     .56     .94    1.12     .94     .37    0.00    1.50    0.00     .56    5.99
0.00    0.00    0.00     .09     .84     .28    0.00     .09     .19     .75    2.25
0.00     .09    0.00    3.09    1.50    7.39     .75     .47     .37   36.76   50.42
0.00     .65     .94    7.02   11.79   18.80    2.15    5.99    2.25   50.42
```

```
1     307

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    1.15     .46    1.26    1.03    0.00     .11    1.49     .69     .23    6.41
0.00     .23     .46     .92     .57    0.00    0.00    0.00     .11     .34    2.63
0.00     .46    0.00    9.74     .57     .34     .92    5.73     .80    3.32   21.88
0.00     .69     .34    3.55   14.32     .11    0.00     .11     .11    1.03   20.27
0.00    0.00    0.00     .34    0.00    1.03     .11     .11     .34     .92    2.86
0.00     .11    0.00     .57     .23     .34    1.49     .23    0.00     .46    3.44
0.00    2.41    1.15    2.06    1.15     .34     .46    9.85     .11     .34   17.87
0.00     .80     .23     .34     .23     .11     .23     .11    1.15     .23    3.44
0.00     .57    0.00    3.09    2.18     .57     .11     .23     .11   14.32   21.19
0.00    6.41    2.63   21.88   20.27    2.86    3.44   17.87    3.44   21.19
```

```
1     308

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00     .71     .82     .71     .82    0.00    0.00     .59     .59     .12    4.36
0.00     .59     .47     .94    1.18    0.00    0.00    0.00     .12     .82    4.12
0.00    0.00    0.00    7.54     .94    0.00     .12    4.24    1.77    1.77   16.37
0.00     .35     .12    3.65   37.93    0.00     .12     .24     .71     .94   44.05
0.00    0.00    0.00    0.00     .12    0.00     .12     .35     .24     .12     .94
0.00     .47    0.00     .24    0.00    0.00     .35     .24     .12    0.00    1.41
0.00    1.18    2.47     .35     .35     .47     .35    4.36     .12     .71   10.37
0.00     .59     .24     .82    1.30     .12     .35    0.00    4.95     .59    8.95
0.00     .47    0.00    2.12    1.41     .35    0.00     .35     .35    4.36    9.42
0.00    4.36    4.12   16.47   44.05     .94    1.41   10.37    8.95    9.42
```

1 309

.18	0.00	0.00	.09	.09	0.00	0.00	0.00	.09	0.00	.45
0.00	0.00	0.00	.27	.45	0.00	.09	.18	3.13	0.00	4.11
0.00	.18	.18	.09	.45	0.00	0.00	0.00	.18	.09	1.16
.09	.36	.09	.63	.18	0.00	0.00	.36	1.52	.27	3.21
.09	.36	.09	.63	7.14	.45	.09	.18	2.41	.54	11.96
0.00	0.00	0.00	0.00	.27	1.16	.09	.18	.27	.45	2.41
0.00	0.00	0.00	0.00	0.00	0.00	.80	.18	.45	.54	1.96
0.00	.18	0.00	.27	.18	0.00	.09	29.55	.45	.71	31.43
.09	3.13	.80	.98	2.77	.18	.36	.36	19.46	5.45	33.57
0.00	.09	.09	.27	.45	.63	.45	.45	5.63	1.70	9.73
.45	4.11	1.16	3.21	11.96	2.41	1.96	31.43	33.57	9.73	

```
1    310

0.00   0.00   0.00   0.00   0.00   0.00    .12   0.00   0.00   0.00    .12
0.00    .24   1.19    .60    .12    .12    .12   3.45   1.43   1.07   8.33
0.00   2.74   3.93   6.07   2.26    .24    .36    .24    .36   1.79  19.98
0.00   1.67    .48   5.48   1.55    .24    .12  10.12    .48   2.26  22.38
0.00    .83    .36   3.45   7.26   0.00   0.00    .24   0.00   1.67  13.81
0.00    .12   0.00    .60    .12   0.00   0.00    .24   0.00    .36   1.43
0.00    .48   0.00    .48   0.00   0.00   0.00    .36   0.00    .48   1.79
0.00    .60  10.36   1.67    .36    .24    .95   1.90    .12   1.19  17.38
0.00    .24   1.31    .24    .48    .12    .12    .12    .60   0.00   3.21
 .12   1.43    .36   3.81   1.67    .48   0.00    .71    .24   4.76  13.57
 .12   8.33  17.98  22.38  13.81   1.43   1.79  17.38   3.21  13.57
```

```
1   401

0.00   0.00   0.00   0.00   0.00   0.00   0.00    .11   0.00   0.00    .11
0.00    .11    .87 . 1.19    .22   1.30   0.00    .11   2.27    .22   6.28
0.00   1.08    .76   1.19   1.52    .97   0.00    .22   1.19   0.00   6.93
 .11   0.00   0.00    .76    .43    .54   0.00   5.74   3.46    .76  11.80
0.00    .22    .22   2.16  12.01   1.08    .22    .65    .97    .11  17.64
0.00   0.00   0.00    .54    .11   1.08    .32   3.14   1.73    .97   7.90
0.00    .22   0.00    .43    .22    .22    .32    .22    .65    .22   2.49
0.00   1.62   2.38   .260   1.19   1.30    .54   5.84    .87    .32  16.67
0.00   2.81   2.71   2.27   1.73    .87    .65    .32  10.28   2.49  24.13
0.00    .22   0.00    .65    .22    .54    .43    .32   2.71    .97   6.06
 .11   6.28   6.93  11.80  17.64   7.90   2.49  16.67  24.13   6.06
```

1 403

0.00	0.00	0.00	.14	0.00	0.00	0.00	.14	0.00	0.00	.29
0.00	1.72	1.43	3.30	.57	.43	0.00	.57	1.58	.29	9.89
.14	.57	2.29	2.58	.72	.14	0.00	0.00	.57	.57	7.59
0.00	.14	0.00	5.87	.57	.14	0.00	6.02	4.73	1.00	18.48
0.00	.14	0.00	1.58	6.16	0.00	0.00	0.00	.43	.86	9.17
0.00	0.00	0.00	.14	.14	0.00	0.00	1.15	0.00	.14	1.58
0.00	0.00	0.00	.14	0.00	0.00	0.00	0.00	0.00	.29	.43
0.00	3.30	2.29	1.58	0.00	.43	0.00	12.46	.29	.14	20.49
.14	3.87	1.58	1.15	.57	0.00	0.00	0.00	20.06	.29	27.65
0.00	.14	0.00	2.01	.43	.43	.43	.14	0.00	.86	4.44
.29	9.89	7.59	18.48	9.17	1.58	.43	20.49	27.65	4.44	

```
1   404

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00     .11    1.20    1.85     .54     .11    0.00     .11     .11    0.00    4.03
0.00     .22    1.09    1.63    1.20    0.00    0.00    0.00    0.00    0.00    4.13
0.00    0.00    0.00    3.81     .11    0.00    0.00    6.86    2.83     .65   14.25
0.00    0.00    0.00    3.48   40.70     .44     .11    0.00    0.00     .11   44.83
0.00    0.00    0.00     .44     .11     .76    0.00    0.00     .22     .11    1.63
0.00    0.00    0.00     .22     .33     .11      76    0.00     .33    0.00    1.74
0.00    2.61    1.85    1.74     .65     .11     .11    7.83    0.00    0.00   14.91
0.00    1.09    0.00     .54     .98     .11     .65    0.00   10.01     .11   13.49
0.00    0.00    0.00     .54     .22    0.00     .11     .11    0.00    0.00     .98
0.00    4.03    4.13   14.24   44.83    1.63    1.74   14.91   13.49     .98
```

1 405

0.00	0.00	0.00	.24	0.00	0.00	.12	0.00	0.00	0.00	.36
0.00	.48	.12	.36	.12	0.00	0.00	.38	1.07	.60	3.21
0.00	.12	.48	4.88	.71	0.00	0.00	.60	.24	1.67	8.69
0.00	.24	.12	3.45	.95	24	.12	9.40	2.02	2.62	19.17
0.00	.60	0.00	1.43	2.38	.24	.24	.24	.71	.60	6.43
0.00	0.00	0.00	.48	.12	0.00	0.00	.48	.48	.48	2.02
0.00	.24	0.00	.48	.24	.12	1.55	.24	.60	1.79	5.24
0.00	.24	6.43	3.10	.48	.24	.48	12.62	.48	1.55	25.60
0.00	.71	1.19	1.43	.60	.24	.71	.24	3.81	3.10	12.02
.36	.60	.36	3.33	.83	.95	2.02	1.31	2.62	4.88	17.26
.36	3.21	8.69	19.17	6.43	2.02	5.24	25.60	12.02	17.26	

1 406

0.00	.13	0.00	.13	0.00	0.00	0.00	0.00	0.00	.13	.39
0.00	0.00	.65	.65	.39	0.00	.13	1.82	3.64	.26	7.53
0.00	1.69	1.17	6.10	2.08	0.00	0.00	.13	.52	.26	11.95
.13	1.30	.26	4.29	.91	.26	.26	8.18	4.94	2.60	23.12
0.00	.78	.26	4.03	6.36	.13	.13	.13	.78	.91	13.51
0.00	.13	0.00	.52	0.00	.39	0.00	.26	.52	.13	1.95
0.00	1.17	.13	.39	.13	.26	.52	0.00	1.04	.91	4.55
.13	.78	4.55	2.73	.52	.13	.65	2.34	.52	.91	13.25
.13	.91	4.68	2.60	1.69	.52	1.95	.13	2.08	1.04	15.71
0.00	.65	.26	1.69	1.43	.26	.91	.26	1.69	.91	8.05
.39	7.53	11.95	23.12	13.51	1.95	4.55	13.25	15.71	8.05	

```
1     407

0.00  0.00  0.00  0.00   0.00   0.00  0.00  0.00   0.00  0.00   0.00
0.00   .25   .12  0.00    .12   0.00  0.00   .12    .86   .62   2.09
0.00  0.00  0.00   .86    .62   0.00   .12   .12    .49   .25   2.46
0.00  0.00  0.00  1.60    .49    .25   .25  4.68   2.09  1.23  10.59
0.00   .49  0.00  3.20  22.29    .37   .37   .12   3.94  2.46  33.25
0.00  0.00  0.00   .12    .25    .12  0.00   .37    .25   .25   1.35
0.00  0.00   .12   .25   1.11    .25   .62   .12   1.72  1.23   5.42
0.00  0.00   .62  1.35   1.11    .12   .62  1.11    .74  1.35   7.02
0.00   .74  1.48  1.48   4.56   0.00  .234  0.00   5.91  3.94  20.44
0.00   .62   .12  1.72   2.71    .25  1.11   .37   4.43  6.03  17.36
0.00  2.09  2.46 10.59  33.25   1.35  5.42  7.02  20.44 17.36
```

```
1    408

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00     .45     .15    2.69     .15     .60     .45    1.80    1.05    2.25    9.58
0.00    1.35     .60    1.65    1.35     .15     .15    1.20    0.00    1.05    7.49
0.00     .15     .30     .15     .45     .30     .60    8.53     .90     .60   11.98
0.00     .30    0.00    1.20    2.25     .75     .30     .45     .75    1.05    7.04
0.00    0.00    0.00     .60     .15    2.40     .90    1.05    1.05    2.54    8.68
0.00     .45     .15    1.80     .45     .75    3.44    0.00     .45    1.95    9.43
0.00    4.94    4.19    1.50     .30     .75    1.05    1.35    0.00     .45   14.52
0.00    1.20    2.10     .60     .30     .60     .60     .15     .90     .60    7.04
0.00     .75    0.00    1.80    1.65    2.40    1.95    0.00    1.95   13.77   24.25
0.00    9.58    7.49   11.98    7.04    8.68    9.43   14.52    7.04   24.25
```

```
1    409

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00     .56     .34     .22    0.00    0.00    0.00    0.00    0.00    1.12
0.00     .34     .34    1.23    1.12    0.00    0.00   0.00      .11    0.00    3.14
0.00    0.00    0.00    3.14    0.00     .11    0.00    4.03    3.92    1.46   12.65
0.00    0.00    0 .00   4.03   31.91    2.02     .22     .11     .22    1.23   39.75
0.00    0.00    0.00    1.57    2.58    7.61    0.00    0.00     .22    1.57   13.55
0.00    0.00    0.00     .90     .45     .90    1.01    0.00    0.00     .11    3.36
0.00     .78    2.13     .56     .45    0.00     .22     .90    0.00     .22    5.26
0.00    0.00     .11     .45    2.35     .34    1.12    0.00    2.58     .22    7.17
0.00    0.00    0.00     .45     .67    2.58     .78     .22     .11    9.18   14.00
0.00    1.12    3.14   12.65   39.75   13.55    3.36    5.26    7.17   14.00
```

1 410

.35	0.00	0.00	.23	.12	0.00	0.00	0.00	.12	0.00	.81
0.00	0.00	.12	0.00	.92	.12	0.00	.46	.35	0.00	1.96
0.00	.58	.46	.58	1.73	0.00	0.00	.12	.12	.12	3.68
0.00	0.00	0.00	7.94	.92	0.00	0.00	3.34	1.96	1.61	15.77
0.00	.58	0.00	4.95	50.06	0.00	0.00	0.00	.35	1.04	56.96
0.00	0.00	0.00	0.00	.12	0.00	0.00	0.00	0.00	0.00	.12
0.00	0.00	0.00	.12	.23	0.00	0.00	.35	.12	0.00	.81
0.00	.35	2.42	.69	.58	0.00	.46	2.76	0.00	0.00	7.25
.46	.35	.69	.58	.81	0.00	.35	0.00	4.03	.23	7.48
0.00	.12	0.00	.69	1.50	0.00	0.00	.23	.46	2.19	5.18
.81	1.96	3.68	15.77	56.96	.12	.81	7.25	7.48	5.18	

SECOND SEMESTER

INDIVIDUAL TEACHER MATRICES

1 101

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.12	.12
0.00	.24	.95	.24	.36	0.00	.12	.12	.83	.48	3.33
0.00	.12	2.98	.36	2.62	0.00	0.00	0.00	.12	.12	6.31
0.00	0.00	0.00	2.02	.83	0.00	0.00	1.34	2.38	1.19	7.86
0.00	.48	.95	3.81	41.90	.12	0.00	0.00	.48	.36	48.10
0.00	0.00	0.00	0.00	0.00	0.00	.12	.12	.12	.12	.48
0.00	0.00	0.00	.12	0.00	.24	.35	0.00	.24	.12	1.07
0.00	.60	.48	.48	0.00	0.00	0.00	3.69	.71	.24	6.19
0.00	1.90	.83	.12	1.07	.12	.24	.24	15.24	1.07	20.83
.12	0.00	.12	.71	1.31	0.00	.24	.60	.71	1.90	5.71
.12	3.33	6.31	7.86	48.10	.48	1.07	6.19	20.83	5.71	

```
   1     102

  .23    0.00     .11    0.00    0.00     .11     .11    0.00    0.00    0.00     .57
  .11    0.00     .23     .11    0.00    0.00     .11    0.00     .57    0.00    1.15
 0.00     .23    7.11    2.06    2.41     .11     .23     .11     .80     .80   13.88
 0.00    0.00     .11    1.83     .57     .11    0.00    1.72    3.33     .23    7.91
  .11    ..23     .46    2.52   18.12    0.00     .46    0.00     .80     .57   23.28
 0.00    0.00    0.00    0.00     .11     .46    0.00    0.00     .23     .23    1.03
 0.00    0.00    0.00     .11     .34    0.00    1.26    0.00     .34     .69    2.75
 0.00     .34     .80     .23     .23    0.00    0.00   11.93     .11    5.62   19.27
 0.00     .34    4.70     .46     .69    0.00     .11     .11    5.85     .69   12.96
  .11    0.00     .34     .57     .80     .23     .46    5.39     .92    8.37   17.20
  .57    1.15   13.88    7.91   23.28    1.03    2.75   19.27   12.96   17.20
 1    103

  .12   0.00   0.00   0.00   0.00   0.00   0.00   0.00    .12   0.00    .24
 0.00    .12    .12    .36    .36    .12   0.00   0.00    .60    .36   2.02
 0.00    .12   1.43   1.19   2.02   0.00   0.00   0.00    .12   0.00   4.88
 0.00   0.00   0.00   1.55   0.00    .12   0.00   2.14   3.10    .83   7.74
 0.00    .48    .12   2.62  38.21    .71    .24    .12   2.38    .83  45.71
 0.00   0.00   0.00   0.00    .12    .48   0.00   1.07    .36    .12   2.14
 0.00   0.00   0.00    .24    .60    .12   1.31   0.00    .24    .36   2.86
 0.00   0.00    .95    .71   1.19    .24   0.00   5.71    .12    .24   9.17
 0.00   1.31   2.26    .83   2.50    .12   1.07   0.00   7.38   2.50  17.98
  .12   0.00   0.00    .24    .71    .24    .24    .12   3.57   2.02   7.26
  .24   2.02   4.88   7.74  45.71   2.14   2.86   9.17  17.98   7.26
```

```
1    104

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00    .26    .26    .26   0.00   0.00   0.00    .26    .26   1.28
0.00    .13    .13    .89    .64   0.00   0.00   0.00    .13    .89   2.81
0.00   0.00   0.00   2.17    .51   0.00   0.00   3.32    .51   1.79   8.30
0.00    .13   0.00   1.66  10.22    .51    .38    .13   1.15   4.73  18.90
0.00   0.00   0.00   0.00    .13    .13    .13    .13    .51    .77   1.79
0.00   0.00   0.00    .26    .38    .38   2.30   0.00   1.02   1.15   5.49
0.00    .51   1.40    .13    .38   0.00   0.00   9.83    .38   4.21  16.86
0.00    .26    .77    .13   1.15    .13   1.02   0.00   3.70   2.68   9.83
0.00    .26    .26   2.81   5.24    .54   1.66   3.45   2.17  18.26  34.74
0.00   1.28   2.81   8.30  18.90   1.79   5.49  16.86   9.83  34.74
```

```
1     105

0.00   0.00   0.00   0.00   0.00   0.00   0.00    .12    .12    .12    .36
0.00    .24   1.90    .12    .24   0.00   0.00    .60   1.31    .24   4.64
0.00   1.07   2.14   1.67   4.52   0.00   0.00    .24    .83   1.55  12.02
0.00    .12   0.00   1.67    .71    .24   0.00   7.02   1.19    .71  11.67
 .24    .83    .48   4.52  22.86    .24    .36    .48   2.86   2.26  35.12
0.00   0.00   0.00    .12   0.00   0.00   0.00    .36    .12    .12    .71
0.00   0.00   0.00    .24    .36   0.00    .36    .12    .36    .36   1.79
 .12    .95   5.12    .95   1.55    .12    .12   1.19    .48   1.07  11.67
0.00    .83   1.90    .60   3.10   0.00    .71    .12   4.17   1.31  12.74
0.00    .60    .48   1.79   1.79    .12    .24   1.43   1.31   1.55   9.29
 .36   4.64  12.02  11.67  35.12    .71   1.79  11.67  12.74   9.29
 1    106

  .24   0.00   0.00    .24   0.00    .12    .12   0.00    .36   0.00   1.08
  .24    .12    .96    .72    .48    .72    .12   0.00    .60   1.08   5.02
 0.00    .60    .72    .48    .12    .36   0.00   0.00    .24    .12   2.63
 0.00    .36   0.00   1.08   1.08    .48   0.00   1.91   2.75   1.79   9.44
  .12    .72   0.00   1.79  14.22   1.55    .12   0.00   1.55   1.08  21.15
  .12    .12   0.00    .84   1.19   4.06    .84    .84   1.79   2.03  11.83
 0.00    .12   0.00    .12    .24   2.03    .84    .12    .72   1.67   5.85
 0.00   1.19   0.00    .36    .72    .36    .12   5.50    .12    .12   8.48
  .24   1.55    .84   2.99   1.55    .60   1.08   0.00    .96   1.31  11.11
  .12    .24    .12    .84   1.55   1.55   2.63    .12   2.03  14.22  23.42
 1.08   5.02   2.63   9.44  21.15  11.83   5.85   8.48  11.11  23.42
```

```
1    107

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .12   1.31    .71   0.00    .24   0.00    .48   1.79    .24   4.88
0.00    .71   2.74   2.98   2.26   0.00   0.00    .36    .60   1.07  10.71
0.00   0.00    .12   3.21    .95    .24   0.00   7.14   3.57   1.19  16.43
0.00    .71    .36   4.29  20.36   0.00   0.00    .24    .63   1.31  27.62
0.00   0.00   0.00    .60    .12   0.00    .36    .60    .24   0.00   1.90
0.00    .24    .12    .24   0.00    .24    .12    .24    .24    .36   1.79
0.00   1.07   3.69   1.67   1.07    .60    .24   1.55    .48   1.19  11.55
0.00   1.55   2.38   1.31   1.31    .48    .60    .12   5.48   2.26  15.48
0.00    .48   0.00   1.43   1.55    .12    .48    .83   2.74   2.02   9.64
0.00   4.88  10.71  16.43  27.62   1.90   1.79  11.55  15.48   9.64
```

1 108

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.12	.12
.12	.95	4.29	.36	1.07	.12	0.00	.12	5.24	1.43	13.69
0.00	2.38	5.12	1.79	2.74	0.00	0.00	0.00	.95	1.19	14.17
0.00	0.00	.12	2.86	.71	0.00	0.00	3.93	o.19	.95	9.76
0.00	2.74	.36	3.21	10.12	0.00	0.00	0.00	.71	.95	18.10
0.00	0.00	0.00	0.00	0.00	0.00	.12	0.00	0.00	.12	.24
0.00	.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.60	.71
0.00	1.55	1.19	.24	.24	0.00	0.00	.36	.83	0.00	4.40
0.00	4.05	2.86	.24	1.31	0.00	.12	0.00	16.67	1.79	27.02
0.00	1.90	.24	1.07	1.90	.12	.48	0.00	1.43	4.64	11.79
.12	13.69	14.17	9.76	18.10	.24	.71	4.40	27.02	11.79	

```
  1     109

  0.00   0.00   0.00    .12   0.00   0.00   0.00   0.00   0.00   0.00    .12
  0.00    .24    .60    .60    .24   0.00    .12    .36   1.19    .48   3.81
  0.00    .36   1.07   1.79   2.02   0.00   0.00    .48    .60    .71   7.02
  0.00   0.00    .12   3.69   1.79    .24    .12   6.43   1.19    .83  14.40
   .12    .95    .24   4.64  27.50   1.43    .71    .48   1.07   1.79  38.93
  0.00   0.00   0.00    .83    .24    .24    .12    .48    .24    .48   2.62
  0.00    .36   0.00    .24    .60    .24    .36    .60    .12    .71   3.21
  0.00    .71   3.69   1.07   2.38    .36    .60   2.74    .36    .48  12.38
  0.00    .60   1.31    .48   1.90    .12    .48   0.00   4.40    .71  10.00
  0.00    .60   0.00    .95   2.26   0.00    .71    .83    .83   1.31   7.50
   .12   3.81   7.02  14.40  38.93   2.62   3.21  12.38  10.00   7.50
```

```
1    110

0.00   0.00   0.00   0.00     .13   0.00   0.00   0.00   0.00   0.00     .13
0.00   0.00   3.11   1.17     .65    .13   0.00    .26   1.17    .39    6.87
0.00    .91   3.24    .91    2.85   0.00   0.00    .13   1.30   0.00    9.34
0.00    .39   0.00   4.80    1.30    .26    .13   3.37   4.02    .91   15.18
0.00   0.00   0.00   4.41   18.16    .91    .13   0.00   1.56    .39   25.55
0.00    .13   0.00    .13     .26   1.56    .13    .26   ..26    .26    2.98
0.00   0.00   0.00    .39     .13   0.00    .13    .13   0.00   0.00     .78
0.00   1.95   1.04    .78     .26   0.00    .13   5.45    .39    .52   10.51
 .13   3.11   1.30   2.46    1.04   0.00    .13    .13   9.60   2.98   20.88
0.00    .39    .65    .13     .78    .13   0.00    .78   2.59   2.33    7.78
 .13   6.87   9.34  15.18   25.55   2.98    .78  10.51  20.88   7.78
```

1 111

0.00	0.00	0.00	0.00	.15	0.00	0.00	0.00	0.00	0.00	.15
0.00	.15	2.87	.30	0.00	.15	.15	0.00	.91	0.00	4.54
0.00	.45	3.63	1.06	1.06	.15	0.00	0.00	2.87	.76	9.98
0.00	0.00	0.00	1.06	.30	0.00	0.00	.15	4.39	.91	6.81
0.00	0.00	0.00	1.21	8.47	0.00	0.00	0.00	1.21	.76	11.65
0.00	0.00	0.00	.30	.15	1.36	0.00	.15	1.66	1.21	4.84
0.00	0.00	.15	0.00	0.00	.76	.30	.15	.15	.61	2.12
0.00	.30	0.00	0.00	0.00	0.00	.15	1.36	0.00	0.00	1.82
.15	3.33	2.72	2.27	.61	.61	.61	0.00	15.89	6.51	32.68
0.00	.30	.61	.61	.91	1.82	.91	0.00	5.60	14.67	25.42
.15	4.54	9.98	6.81	11.65	4.84	2.12	1.82	32.68	25.42	

1 112

.12	0.00	0.00	0.00	.36	0.00	0.00	0.00	0.00	0.00	.48
0.00	0.00	.48	0.00	.48	0.00	.12	.12	2.62	0.00	3.81
0.00	.71	4.17	1.55	3.33	0.00	0.00	0.00	0.00	.12	9.88
0.00	.12	.24	3.69	1.07	.24	.12	2.02	1.79	.60	9.88
.36	1.19	1.19	2.50	33.81	.48	.12	0.00	1.67	2.26	43.57
0.00	0.00	0.00	.24	.48	0.00	0.00	.36	.36	0.00	1.43
0.00	.24	0.00	0.00	.36	.12	.48	0.00	0.00	.36	1.55
0.00	.24	1.55	.24	.24	0,00	0.00	0.00	.24	0.00	2.50
0.00	1.19	2.26	.60	1.79	.48	.60	0.00	14.05	.36	21.31
0.00	.12	0.00	1.07	1.67	.12	.12	0.00	.60	1.90	5.60
.48	3.81	9.88	9.88	43.57	1.43	1.55	2.50	21.31	5.60	

```
1     113

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    2.41    2.51    1.36    0.00    0.00    0.00    0.00    0.00    6.28
0.00    1.47     .84    3.25    2.20    0.00    0.00    0.00    0.00     .10    7.85
0.00    0.00    0.00    4.71    0.00     .63    0.00   11.20    3.35    1.57   21.47
0.00    0.00    0.00    5.42   28.48     .31     .10    0.00    0.00     .21   34.35
0.00    0.00     .10     .84     .21     .31    0.00     .31     .42     .42    2.62
0.00    0.00    0.00     .10     .21    0.00     .21    0.00    0.00    0.00     .52
0.00    4.71    4.29    1.78     .42     .52    0.00    2.51    0.00    0.00   14.24
0.00     .10     .21    1.57    1.05     .73     .10    0.00    5.65    0.00    9.42
0.00    0.00    0.00    1.47     .42     .10     .10     .21    0.00     .94    3.25
0.00    6.28    7.85   21.47   34.35    2.62     .52   14.24    9.42    3.25
```

```
 1   201

  .26    .13   0.00   0.00    .26   0.00   0.00   0.00    .13    .13    .92
  .26    .92   1.05   0.00    .52    .65    .13    .26   1.18    .39   5.37
 0.00    .92   1.05    .39   1.44   1.05   0.00    .39    .39    .26   5.89
 0.00   0.00   0.00    .79    .13    .13   0.00   1.83   2.09    .65   5.63
  .13    .39   0.00   1.83  17.67   1.83    .39   1.05   2.49   1.44  27.23
 0.00    .13   0.00    .13    .65   6.02    .39    .52   2.36   2.23  12.43
 0.00    .13   0.00    .26    .39    .39    .65   0.00    .13    .13   2.09
 0.00   1.05   1.05    .52   1.05   0.00    .13   3.01   0.00    .39   7.20
  .26   1.57   2.62    .39   3.39   1.05    .26   0.00   4.58   3.14  17.80
 0.00    .13    .13   1.31   1.18   1.31    .13    .13   4.45   6.68  15.45
  .92   5.37   5.89   5.63  27.23  12.43   2.09   7.20  17.80  15.45
```

```
1     202

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   0.00    .31   0.00   0.00    .15    .46    .46    .15   1.54
0.00    .31    .31   3.70   1.54    .15   0.00    .31    .46    .62   7.41
0.00   0.00   0.00   6.33   1.08    .62    .31   6.48   2.47   2.78  20.06
0.00    .15   0.00   3.09   4.32    .31    .77    .15    .62   1.85  11.27
0.00   0.00   0.00    .62    .15   1.08    .46   1.08    .62   2.01   6.02
0.00    .15   0.00   0.00    .15   1.39   1.23    .31   1.23   1.54   6.02
0.00    .15   4.94   2.78    .77    .31    .46   8.02    .15   1.39  18.98
0.00    .46   2.01    .77   1.23    .77   1.54   0.00   3.86   1.23  11.88
0.00    .31    .15   2.47   2.01   1.39   1.08   2.16   2.01   5.25  16.82
0.00   1.54   7.41  20.06  11.27   6.02   6.02  18.98  11.88  16.82
```

```
 1    203

  .60   0.00    .12    .24    .24   0.00   0.00   0.00   0.00   0.00   1.19
  .12   0.00   1.31   1.07    .83   0.00   0.00    .24   2.14   0.00   5.71
  .12    .48   2.98    .83   3.69   0.00   0.00   0.00   1.07   0.00   9.17
 0.00   0.00   0.00   7.26    .83    .12   0.00   3.45   3.93    .71  16.31
  .24    .48    .48   4.76  28.81    .36   0.00    .24    .60    .12  36.07
 0.00   0.00   0.00   0.00   0.00    .36   0.00    .36    .36    .36   1.43
 0.00   0.00   0.00    .24    .12   0.00   0.00   0.00   0.00   0.00    .36
 0.00   1.43   1.67    .48    .24    .12   0.00   2.14    .60   0.00   6.67
 0.00   3.33   2.62   1.07   1.19    .24    .36    .12  11.55    .60  21.07
  .12   0.00   0.00    .36    .12    .24   0.00    .12    .83    .24   2.02
 1.19   5.71   9.17  16.31  36.07   1.43    .36   6.67  21.07   2.02
```

```
1     204

1.19    0.00    0.00     .12     .36    0.00     .12    0.00    0.00    0.00    1.79
0.00     .48    1.19     .48     .71     .12     .12    0.00    1.55     .12    4.76
0.00     .83    5.12    2.98    1.55    0.00     .36     .12    9,99     .60   11.55
0.00     .12     .24    2.50     .48     .36     .12    5.60    2.14    1.31   12.86
0.00     .48     .60    2.98   14.76     .36     .48    0.00    0.00     .60   20.24
0.00     .12    0.00     .60    0.00     .12     .12     .36     .24     .95    2.50
 .24     .24    0.00     .60     .48     .36    1.07     .60     .24     .60    4.40
 .12     .83    2.86     .60    1.07     .24     .83    1.90     .48     .24    9.17
0.00    1.43    1.31     .83     .36     .12     .60    0.00   19.05     .48   24.17
 .24     .24     .24    1.19     .48     .83     .60     .60     .48    3.69    8.57
1.79    4.76   11.55   12.86   20.24    2.50    4.40    9.17   24.17    8.57
```

```
1     205

  .10   0.00   0.00   0.00    .10   0.00   0.00   0.00    .10   0.00    .31
 0.00    .31    .51    .10    .10    .10   0.00   0.00   1.12    .31   2.55
 0.00    .51   1.22   2.24   1.94    .51    .31   0.00   1.12   0.00   7.86
 0.00   0.00   0.00   1.12    .10    .10   0.00   1.73   5.31    .31   8.67
  .10    .31    .41   2.86  31.33    .41    .10    .20   2.65   1.02  39.39
 0.00   0.00   0.00   0.00    .31    .61   0.00    .31    .61    .41   2.24
 0.00   0.00    .10    .20    .31    .10    .21   0.00    .41    .20   1.53
 0.00    .10    .92    .51    .20   0.00    .20    .51    .20    .20   2.86
 0.00   1.22   4.39   1.22   3.88    .31    .51   0.00   8.27   4.29  24.08
  .10    .10    .31    .41   1.12    .10    .20    .10   4.29   3.78  10.51
  .31   2.55   7.86   8.67  39.39   2.24   1.53   2.86  24.08  10.51
```

```
1     206

  .42   0.00    .42    .42   0.00   0.00   0.00   0.00    1.4   0.00   1.41
 0.00    .14   1.41    .42    .28    .14   0.00    .28   2.26    .14   5.08
  .14   1.41   7.91   2.54   1.27    .28   0.00   0.00    .56    .28  14.41
  .14    .71   0.00   6.07    .99    .85   0.00    .85   3.95   1.84  15.40
 0.00    .28   0.00   2.54   7.91    .85   0.00    .14    .14    .28  12.15
 0.00   0.00   0.00    .85    .85   2.12   0.00    .56    .56    .14   5.08
 0.00   0.00   0.00   0.00    .14   0.00   0.00   0.00   0.00   0.00    .14
 0.00    .56    .42    .14    .14   0.00   0.00   3.81    .42    .14   5.56
  .71   1.69   3.81   1.41    .14    .42   0.00   0.00  25.42    .99  34.60
 0.00    .28    .42   1.13    .42    .42    .14   0.00    .99   2.26   6.07
 1.41   5.08  14.41  15.54  12.15   5.08    .14   5.56  34.46   6.07
```

1 207

0.00	.15	0.00	0.00	0.00	0.00	0.00	0.00	.15	0.00	.29
0.00	.29	1.47	1.61	.88	0.00	0.00	0.00	.59	.15	4.99
0.00	1.17	2.64	1.03	1.32	0.00	.59	0.00	1.32	0.00	8.06
0.00	0.00	0.00	3.37	0.00	.59	.29	2.79	3.81	3.67	14.52
0.00	.15	0.00	2.79	12.46	.59	.44	.15	.88	.59	18.04
0.00	0.00	.15	.44	0.00	2.05	.15	1.47	1.32	.44	6.01
0.00	.29	0.00	.59	.59	1.61	.73	0.00	.44	.29	4.55
0.00	1.03	1.47	.29	.73	0.00	.15	.73	.29	1.17	5.87
.15	1.47	2.20	2.64	.88	.15	1.32	0.00	3.81	7.33	19.94
.15	.44	.15	1.76	1.17	1.03	.88	.73	7.33	4.11	17.74
.29	4.99	8.06	14.52	18.04	6.01	4.55	5.87	19.94	17.74	

```
1     208

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .28    .28   0.00    .28   0.00   0.00   0.00    .57   0.00   1.42
0.00    .57    .85    .57   1.42    .28   0.00   0.00    .28   0.00   3.99
0.00   0.00   0.00   1.42   0.00   0.00   0.00   1.99   3.70   0.00   7.12
0.00   0.00    .28   2.28  47.58   1.14    .28   0.00    .85   1.14  53.56
0.00   0.00   0.00   0.00   0.00    .85   0.00    .28    .57    .57   2.28
0.00   0.00   0.00    .28   0.00   0.00   1.14   0.00    .57    .28   2.28
0.00   0.00    .57    .57    .85   0.00   0.00   8.26    .28   0.00  10.54
0.00    .57   1.99   1.42   2.28   0.00    .28   0.00   4.27   2.28  13.11
0.00   0.00   0.00    .57   1.14   0.00    .57   0.00   1.99   1.42   5.70
0.00   1.42   3.99   7.12  53.56   2.28   2.28  10.54  13.11   5.70
```

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	.24	.60	.36	.24	0.00	0.00	0.00	1.79	.36	3.57
0.00	.60	1.67	.60	2.14	0.00	0.00	0.00	.71	1.31	7.02
0.00	0.00	.12	.71	.36	0.00	.12	2.86	1.90	1.19	7.26
0.00	.83	.48	2.50	17.98	.24	.24	.12	2.02	5.95	30.36
0.00	0.00	0.00	.12	.24	.24	.12	.24	0.00	.60	1.55
0.00	0.00	0.00	.12	.24	.36	.24	.24	.60	.60	2.38
0.00	.24	1.19	.60	.36	0.00	.12	.24	.12	1.31	4.17
0.00	.95	1.67	.95	3.93	.12	.60	0.00	5.24	4.40	17.86
0.00	.71	1.31	1.31	4.88	.60	.95	.48	5.48	10.12	25.83
0.00	3.57	7.02	7.26	30.36	1.55	2.38	4.17	17.86	25.83	

```
1     210

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    2.72    1.59     .91    0.00    0.00     .23    1.25    0.00    6.70
0.00     .34     .57    3.18    3.97     .11    0.00     .11     .45     .45    9.19
0.00     .45    0.00    2.16     .11    0.00    0.00    5.11    6.36    1.82   16.00
0.00     .34    0.00    5.22   22.59    0.00     .11    0.00     .79     .11   29.17
0.00    0.00    0.00     .11    0.00    0.00    0.00    .34     0.00    0.00     .45
0.00    0.00    0.00    0.00     .11    0.00    0.00    0.00    0.00    0.00     .11
0.00    3.29    1.02     .91     .34     .34    0.00    5.79    0.00    0.00   11.69
0.00    2.04    4.88    1.82     .68    0.00    0.00    0.00   13.96     .11   23.50
0.00     .23    0.00     .91     .45    0.00    0.00     .23     .68     .45    2.95
0.00    6.70    9.19   15.89   29.17     .45     .11   11.80   23.50    2.95
```

```
1     211
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00     .12    0.00    0.00    0.00    0.00    1.67    0.00    1.79
0.00    0.00    0.00     .24     .48    0.00    0.00    0.00     .48     .12    1.31
0.00    0.00    0.00     .71     .12    0.00    0.00    3.81     .83    1.55    7.02
0.00     .48    0.00    1.31    6.07     .36     .48     .24    1.31    4.40   14.64
0.00    0.00    0.00    0.00     .24     .83     .36     .48     .48    2.50    4.88
0.00    0.00    0.00     .36     .12     .60     .24     .12     .24    2.38    4.05
0.00     .12     .60     .83    1.07    0.00     .48    7.14     .36    2.26   12.86
0.00     .48     .60    1.55    3.21     .36     .95     .24    6.55    4.88   18.81
0.00     .71     .12    1.90    3.33    2.74    1.55     .83    6.90   16.55   34.64
0.00    1.79    1.31    7.02   14.64    4.88    4.05   12.86   18.81   34.64
```

```
1     212

0.00   0.00    .13   0.00    .40   0.00   0.00   0.00    .13   0.00    .67
 .13   0.00   2.27   1.73   1.20    .27   0.00   0.00   0.00    .27   5.87
 .13   1.73   3.07   1.47   2.00    .67   0.00    .53    .53   0.00  10.13
0.00    .40   0.00   1.73    .40    .40    .27   9.07   2.80   1.20  16.27
 .13    .40    .13   3.47  19.47   1.33   0.00    .27    .80   1.33  27.33
0.00   0.00   0.00    .27   1.07   1.60    .27   1.33    .27    .40   5.20
0.00   0.00    .13    .27   0.00    .27   0.00    .27   0.00    .13   1.07
0.00   2.67   3.20   4.00    .93   0.00    .27   1.87    .13   1.60  14.67
 .27    .53   1.07   1.87    .80    .27    .13   0.00    .67   1.07   6.67
0.00    .13    .13   1.47   1.07    .40    .13   1.33   .133   6.13  12.13
 .67   5.87  10.13  16.27  27.33   5.20   1.07  14.67   6.67  12.13
```

1 213

.24	0.00	.24	.36	.24	0.00	0.00	0.00	.12	.12	1.31
.12	.12	1.43	1.43	.36	.12	.12	.60	1.55	.12	5.95
.24	1.79	2.26	3.45	2.26	0.00	.12	0.00	1.43	.60	12.14
0.0	.12	.12	.83	0.00	.24	.12	6.90	4.40	.71	13.45
.24	0.00	.36	2.02	12.26	.83	.48	.48	1.19	.71	18.57
0.00	0.00	.12	.12	.60	1.43	0.00	.95	.60	.48	4.29
0.00	0.00	0.00	.60	.48	.48	1.31	.24	.60	.48	4.17
0.00	1.55	2.50	2.26	.95	.36	.71	1.43	.12	.95	10.83
.48	2.26	4.52	1.55	.95	.24	.71	0.00	4.05	1.90	16.67
0.00	.24	.60	.83	.48	.48	.60	.24	2.62	6.55	12.62
1.31	6.07	12.14	13.45	18.57	4.17	4.17	10.83	16.67	12.62	

```
1    214

0.00   0.00   0.00    0.00    0.00   0.00   0.00   0.00    0.00   0.00    0.00
0.00   0.00   2.31     .69     .12   0.00    .12   0.00     .23    .23    3.70
0.00   0.00    .35    4.17    1.50    .35    .12   0.00    0.00    .35    6.83
0.00   0.00   0.00    3.24    0.00    .23    .12   4.28   10.30   1.16   19.33
0.00   0.00   0.00    4.05   18.40    .46    .46   0.00     .23    .35   23.96
0.00   0.00   0.00    1.27     .46    .23    .23   0.00     .46   1.16    3.82
0.00   0.00   0.00    1.04     .12    .46   1.97   0.00     .23    .81    4.63
0.00   1.16   1.39     .46     .35    .35    .35   1.39    0.00    .35    5.79
0.00   2.55   2.78    2.78    2.55    .69    .46   0.00   11.11    .12   23.03
0.00   0.00   0.00    1.62     .46   1.04    .81    .12     .46   4.40    8.91
0.00   3.70   6.83   19.33   23.96   3.82   4.63   5.79   23.03   8.91
```

```
1     301

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00     .24     .24     .36    0.00     .12     .12    1.67     .36    3.10
0.00     .83    2.02    4.17    3.45    0.00    0.00     .12     .12     .60   11.31
0.00    0.00     .24    6.07    1.07     .36    0.00    9.05    2.50    1.19   20.48
0.00     .60     .48    5.60   10.81     .24    0.00     .12    2.14    1.79   29.76
0.00    0.00    0.00     .36    0.00    0.00    0.00     .24    0.00     .48    1.07
0.00     .12    0.00     .12     .12    0.00    0.00     .36     .24     .48    1.43
0.00     .60    6.31    1.31     .83    0.00     .50    2.26     .34     .71   12.86
0.00     .71    1.67    1.31    2.62     .12     .60    0.00    3.57    1.31   11.90
0.00     .24     .36    1.31    2.50     .36     .12     .60    1.43    1.19    8.10
0.00    3.10   11.31   20.48   29.76    1.07    1.43   12.86   11.90    8.10
```

```
1     302

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    2.29    1.48     .67    0.00    0.00     .27     .27     .13    5.12
0.00     .27    1.75    1.48    2.29    0.00     .13    0.00     .27     .13    6.33
0.00     .13    0.00    2.02     .81    0.00     .54    6.06    5.80     .81   16.17
0.00     .13    0.00    4.45   20.75     .13     .54     .27    1.75    1.08   29.11
0.00    0.00    0.00     .27     .54     .27     .13     .27     .40     .27    2.16
0.00     .27    0.00    1.75     .94     .81     .94     .13    1.35     .13     6.33
0.00    2.56     .54    1.89     .54     .54     .67    3.64     .40    0.00   10.78
0.00    1.75    1.75    2.43    1.62     .13    3.10    0.00    8.36     .67   19.81
0.00    0.00    0.00     .40     .94     .27     .27     .13    1.21     .94    4.18
0.00    5.12    6.33   16.17   29.11    2.16    6.33   10.78   19.81    4.18
```

```
1    303
                                                                             0.00
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    5.38
0.00    0.00    2.39    1.20    1.40     .20    0.00     .10     .10    0.00    3.89
0.00     .20     .30     1.20   2.09     .10    0.00    0.00    0.00    0.00   17.15
0.00    0.00    0.00    6.78     .10     .10    0.00    4.69    4.89     .60   31.01
0.00    0.00    0.00    4.49   25.52     .40    0.00     .10     .40     .10    1.30
0.00    0.00    0.00     .10     .40    0.00    0.00     .50     .20     .10     .10
0.00    0.00    0.00     .10    0.00    0.00    0.00    0.00    0.00    0.00   12.96
0.00    2.79     .70    1.20     .30     .30     .10    7.58    0.00    0.00   26.92
0.00    2.39     .50 1.69        .80     .20    0.00    0.00   20.84     .50    1.30
0.00    0.00    0.00     .40     .40    0.00    0.00    0.00     .50    0.00
0.00    5.38    3.89   17.15   31.01    1.30     .10   12.96   26.92    1.30
```

```
1     304

  .26     .12    0.00     .13     .26    0.00    0.00    0.00    0.00    0.00     .77
 0.00     .90     .39     .52     .52    0.00     .13     .26     .39    1.29    4.38
 0.00     .13    1.42    1.80    1.93    0.00    0.00     .13     .13    0.00    5.54
 0.00    0.00    0.00    1.55    0.00    0.00    0.00    4.25    3.09     .26    9.15
 0.00     .52     .13    2.19   27.58    1.16     .39    1.03     .64     .39   34.02
 0.00     .39    0.00    0.00     .39    1.42     .13     .52     .77    1.03    4.64
  .12    0.00    0.00     .26     .13     .52     .77     .13     .39     .13    2.45
  .13     .90    1.80    1.55    1.29     .39     .39   19.46     .13     .13   26.16
  .26    1.16    1.80     .77     .90     .39     .39     .13    1.80     .52    8.12
 0.00     .26    0.00     .39    1.03     .77     .26     .26      .77   1.03    4.77
  .77    4.38    5.54    9.15   34.02    4.64    2.45   26.16    8.12    4.77
```

```
1    305

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00     .55     .66     .66    0.00    0,00    0.00    0.00     .11    1.99
0.00     .22    0.00     .33     .44     .11    0.00    0.00    0.00    0.00    1.10
0.00    0.00    0.00     .44    0.00    0.00     .11    2.98    5.64     .33    9.50
0.00    0.00    0.00    3.98   36.69     .11     .11     .22    1.44     .33   42.87
0.00    0.00    0.00     .22     .11     .11     .11     .55     .33    0.00    1.44
0.00    0.00    0.00     .22     .11    0.00     .44    0.00     .33     .33    1.44
0.00     .99     .33     .77     .88     .66     .11   12.82    0.00     .11   16.69
0.00     .77     .22    2.32    3.54     .44     .55    0.00   15.47     .22   23.54
0.00    0.00    0.00     .55     .44    0.00    0.00     .11     .33    0.00    1.44
0.00    1.99    1.10    9.50   42.87    1.44    1.44   16.69           23.54    1.44
```

```
1    306

 0.00   0.00   0.00    .18   0.00   0.00   0.00   0.00   0.00   0.00    .18
 0.00   0.00   0.00    .71    .36   0.00   0.00    .18   2.68   1.07   5.00
 0.00    .18    .89   3.75    .89   0.00    .18   0.00    .18    .71   6.79
 0.00    .36    .71   8.75   1.25   0.00   0.00   6.25   3.21   2.14  22.68
 0.00   1.25    .18   3.75  10.18    .89    .18   0.00    .36   1.43  18.21
 0.00    .18   0.00    .18    .71    .71   0.00    .18    .18    .18   2.32
 0.00   0.00   0.00    .71    .54   0.00   0.00   0.00   0.00   0.00   1.25
 0.00    .89   3.21   1.25    .36    .18   0.00   1.25    .36    .36   7.86
  .18   1.79   1.79   1.07    .71    .36    .18   0.00  12.32   3.04  21.43
 0.00    .36   0.00   2.32   3.21    .18    .71   0.00   2.14   5.36  14.29
  .18   5.00   6.79  22.68  18.21   2.32   1.25   7.86  21.43  14.29
```

```
1     307

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   1.62    .75   1.08    .22   0.00    .11   0.00   0.00   3.77
0.00    .86    .32   1.94   1.72    .22   0.00    .11   0.00   0.00   5.17
0.00   0.00   0.00   2.37    .32    .22   0.00   5.93   2.80    .86  12.50
0.00   0.00   0.00   4.96  30.82   1.08   0.00   0.00   1.08    .22  38.15
0.00   0.00   0.00   0.00    .54    .75    .11   3.23    .65    .22   5.50
0.00   0.00   0.00    .22    .11    .22   0.00   0.00   0.00   0.00    .54
0.00   2.16   2.59   1.29    .97   2.37    .11  16.27   0.00   0.00  25.75
0.00    .75    .65    .65   1.83    .32    .32    .11   2.26   0.00   6.90
0.00   0.00   0.00    .32    .75    .11   0.00   0.00    .11    .43   1.72
0.00   3.77   5.17  12.50  38.15   5.50    .54  25.75   6.90   1.72
```

```
1     308

 .12   0.00   0.00   0.00    .36   0.00   0.00   0.00   0.00   0.00    .48
0.00    .24    .95   1.07   1.67    .36   0.00    .71    .83    .71   6.55
0.00   1.07    .36   1.07   1.90    .36    .24    .36   0.00    .48   5.83
0.00    .24   0.00   4.05   1.43    .71    .12   7.62   1.19   2.02  17.38
 .24   1.19    .12   6.43  13.21   1.55    .60    .24    .36   1.10  25.12
0.00    .12   0.00    .48    .12    .48    .36   2.02    .48   1.43   5.48
0.00   0.00    .12    .48    .83    .60    .43    .12    .36    .95   3.93
0.00   2.74   3.10   1.43   1.79    .24    .60   3.33    .36   1.79  15.36
0.00    .60    .71    .60    .95   0.00    .60    .12   1.43    .95   5.95
 .12    .36    .48   1.79   2.86   1.10    .95    .83    .95   4.40  13.93
 .48   6.55   5.83  17.38  25.12   5.48   3.93  15.36   5.95  13.93
```

```
1     309

0.00    0.00    0.00     .12    0.00    0.00    0.00    0.00    0.00    0.00     .12
 .12    0.00     .47    0.00     .47    0.00    0.00    0.00     .71     .12    1.89
0.00    0.00    2.13     .36    1.89    0.00     .12    0.00     .12     .24    4.85
0.00    0.00    0.00     .36     .36     .24     .12     .47    3.91     .59    6.04
0.00     .47     .24    2.01   53.61     .12    0.00    0.00    3.20    1.42   61.07
0.00    0.00    0.00     .12     .12     .12    0.00     .12     .24     .12     .83
0.00    0.00    0.00    0.00     .12     .12    0.00    0.00     .12     .12     .47
0.00     .24     .24     .12    0.00    0.00    0.00     .12    0.00     .12     .83
0.00     .95    1.78    2.37    2.72     .12     .12    0.00    9.23    1.07   18.34
0.00     .24    0.00     .59    1.78     .12     .12     .12     .83    1.78    5.56
 .12    1.89    4.85    6.04   61.07     .83     .47     .83   18.34    5.56
```

```
1   310

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00    .83    .48    .36   0.00   0.00    .12   2.26    .12   4.17
0.00    .95   1.07   1.67   1.07   0.00    .12   0.00    .83    .71   6.43
0.00   0.00   0.00   2.50    .12    .24    .12   3.10   4.40    .95  11.43
0.00    .71   0.00   2.38  10.60    .36   0.00    .12   1.43   1.07  16.67
0.00   0.00   0.00    .12    .36    .36    .12    .95    .24    .60   2.74
0.00   0.00    .12    .36    .71    .36   3.10   0.00    .71    .60   5.95
0.00    .48   1.90    .83    .36    .71   0.00   8.33    .24    .24  13.10
0.00   1.55   1.90   1.43   2.26    .12   1.55   0.00  17.98   2.74  29.52
0.00    .48    .60   1.67    .83    .60    .95    .48   1.43   2.98  10.00
0.00   4.17   6.43  11.43  16.67   2.74   5.95  13.10  29.52  10.00
```

```
1   311

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00     .10    1.12     .61     .92    0.00    0.00     .61    1.73     .20    5.31
0.00     .10    2.45    1.94    2.35    0.00    0.00     .71     .31     .20    8.06
0.00    0.00    0.00    4.08     .51    0.00     .10    4.29    3.37     .31   12.65
0.00    0.00     .41    3.57   22.86     .10     .20    0.00    2.65     .20   30.00
0.00    0.00    0.00    0.00     .10    0.00    0.00     .31     .20    0.00     .61
0.00    0.00    0.00     .20     .10     .20     .71    0.00     .31    0.00    1.53
0.00    1.73    2.45     .82     .10    0.00     .10    6.63     .92     .20   12.96
0.00    3.37    1.63    1.02    2.86    0.00     .41     .20   16.73     .61   26.84
0.00    0.00    0.00     .41     .20     .31    0.00     .20     .61     .31    2.04
0.00    5.31    8.06   12.65   30.00     .61    1.53   12.96   26.84    2.04
```

```
1   312

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    2.44     .85     .61     .12    0.00    0.00    0.00    0.00    4.03
0.00     .12    1.47    2.93    3.54    0.00    0.00    0.00    0.00     .12    8.18
0.00    0.00    0.00    4.40     .12     .49    0.00    6.96    4.40     .49   16.85
0.00    0.00    0.00    5.13   31.01    1.22     .12    0.00    0.00     .12   37.61
0.00    0.00    0.00    1.34     .61    2.32     .24     .37    0.00     .61    5.49
0.00    0.00    0.00     .12     .24     .12     .24    0.00    0.00    0.00     .73
0.00    3.05    2.32     .73     .73     .24    0.00    4.88    0.00     .24   12.21
0.00 .85            1.83     .98     .49     .24    0.00    0.00    8.06     .24   12.70
0.00    0.00     .12     .37     .24     .73     .12    0.00     .24     .37    2.20
0.00    4.03    8.18   16.85   37.61    5.49     .73   12.21   12.70    2.20
```

```
 1    401

  .10   0.00   0.00    .10   0.00    .10   0.00   0.00   0.00   0.00    .31
 0.00    .20    .20   1.12    .31   0.00   0.00    .20   2.14    .20   4.39
  .10    .31   1.02   2.24    .20    .10    .10   0.00    .61    .31   5.00
 0.00    .20    .10   1.12    .20    .10   0.00   2.96   6.22    .41  11.33
 0.00    .20    .10   1.02   5.10    .20    .10   0.00    .41    .20   7.35
  .10   0.00   0.00    .20   0.00    .51    .10    .20   1.22    .41   2.76
 0.00    .10   0.00    .20   0.00    .31    .31   0.00    .61    .20   1.73
 0.00    .20    .71   1.02    .10    .31   0.00   5.51    .61    .61   9.08
 0.00   2.86   2.55   3.16    .92    .71    .41   0.00  26.84   6.43  43.88
 0.00    .31    .31   1.12    .51    .41    .71    .20   5.20   5.41  14.18
  .31   4.39   5.00  11.33   7.35   2.76   1.73   9.08  43.88  14.18
```

```
1    402

 .72   0.00    .10    .10    .31   0.00   0.00   0.00    .41   0.00   1.64
 .10    .21    .51    .62    .31   0.00   0.00   0.00    .51   0.00   2.26
 .21    .21   3.19    .92   1.64   0.00   0.00   0.00   1.03   0.00   7.19
0.00   0.00   0.00   6.47    .41   0.00   0.00   1.75   3.29    .72  12.64
 .31    .10    .41   2.67  36.28    .31   0.00    .10   1.13   0.00  41.32
0.00   0.00   0.00    .10    .10    .72   0.00   0.00    .10    .31   1.34
0.00   0.00   0.00    .10   0.00   0.00    .31   0.00    .10   0.00    .51
0.00    .10    .62    .41    .21   0.00   0.00    .51    .51   0.00   2.36
 .31   1.64   2.06   1.03   1.75   0.00    .21   0.00  16.55   1.85  25.39
0.00   0.00    .21    .21    .41    .31   0.00   0.00   1.75   2.47   5.34
1.64   2.26   7.09  12.64  41.42   1.34    .51   2.36  25.39   5.34
```

```
1    403

  .12    .12   0.00    .24    .24   0.00   0.00   0.00    .12    .12    .95
  .12   0.00    .71   0.00    .12   0.00   0.00   0.00    .95    .12   2.02
 0.00    .12   1.43    .83   1.90    .12   0.00    .12    .36    .48   5.36
 0.00    .12   0.00   2.26    .24    .24   0.00   2.98   1.55    .95   8.33
  .36    .36   0.00   1.90  13.45    .24    .12    .12    .83   1.79  19.17
 0.00   0.00   0.00    .12    .12    .12   0.00    .36    .24    .12   1.07
 0.00   0.00    .24   0.00    .12   0.00    .24   0.00    .36   0.00    .95
  .12    .12   2.02    .71    .48    .12    .36  32.86    .24    .83  37.86
  .24   1.07    .95    .48   1.55   0.00    .12   0.00   7.50   3.10  15.00
 0.00    .12   0.00   1.79    .95    .24    .12   1.43   2.86   1.79   9.29
  .95   2.02   5.36   8.33  19.17   1.07    .95  37.86  15.00   9.29
```

1 404

0.00	0.00	0.00	0.00	.10	0.00	0.00	0.00	0.00	0.00	.10
0.00	.21	.21	.21	.31	0.00	.21	.31	.21	.10	1.77
0.00	.31	1.77	1.25	1.77	.42	.21	.10	.52	.31	6.65
0.00	.10	0.00	1.35	0.00	.42	.10	4.15	2.28	.62	9.03
.10	.42	.21	2.60	20.98	.83	.42	.21	.52	.83	27.10
0.00	0.00	0.00	.42	.31	1.66	.10	.93	.73	1.87	6.02
0.00	0.00	0.00	.83	1.25	.83	6.02	0.00	.73	.73	10.83
0.00	.21	3.01	1.04	.42	.52	.21	.62	0.00	.42	6.44
0.00	.42	1.45	.52	.73	.21	2.18	.10	1.25	2.08	8.93
0.00	.10	0.00	.83	1.25	1.14	.93	0.00	2.70	16.61	23.57
.10	1.77	6.65	9.03	27.10	6.02	10.38	6.44	8.93	23.57	

```
1     405
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    1.55    1.81     .65    1.16     .13    0.00     .13    0.00    5.43
0.00    2.46     .78    1.42     .91     .52    0.00    0.00     .13    0.00    6.21
0.00    0.00    0.00    2.33     .13     .39     .78    6.60    2.85    1.29   14.36
0.00     .13    0.00    1.68    6.08    1.68     .13    0.00     .39     .39   10.48
0.00    0.00    0.00     .39     .39    3.23     .39    3.23    1.16    1.55   10.35
0.00    0.00     .26    1.55     .39    1.42    2.07     .78    1.94     .91    9.31
0.00    2.46    2.98    2.59     .52     .39    1.55    4.01    0.00    1.55   16.04
0.00     .39     .65    1.55     .65     .91    3.10    0.00    1.68    2.46   11.38
0.00    0.00    0.00    1.03     .78     .65    1.16    1.42    3.10    8.28   16.43
0.00    5.43    6.21   14.36   10.48   10.35    9.31   16.04   11.38   16.43
```

1 406

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	3.20	.67	1.07	.13	.13	.53	1.87	.27	7.88
0.00	1.47	4.14	1.74	1.07	.53	.40	0.00	.67	0.00	10.01
0.00	.13	0.00	3.60	.67	.67	.53	4.41	4.27	.80	15.09
0.00	.53	0.00	2.94	8.95	.53	.40	.13	2.54	0.00	16.02
0.00	0.00	0.00	.80	.27	.40	0.00	.53	1.20	.80	4.01
0.00	0.00	.13	1.07	.53	.53	.67	.27	1.87	.27	5.34
0.00	3.07	1.20	.53	0.00	.13	.40	5.34	.27	.27	11.21
0.00	2.67	1.34	3.34	2.94	.40	2.67	0.00	7.08	3.47	23.90
0.00	0.00	0.00	.40	.53	.67	.12	0.00	4.14	.67	6.54
0.00	7.88	10.01	15.09	16.02	4.01	5.34	11.21	23.90	6.54	

```
1    407

 .11    0.00   0.00    .11     .11   0.00   0.00   0.00   0.00   0.00    .34
0.00     .34   1.83    .80     .34    .11    .11    .11   1.26    .34   5.26
 .11    1.03   1.83   2.40    2.29   0.00   0.00    .23   1.03   0.00   8.91
0.00    0.00   0.00   1.26     .34    .11    .11   3.31   5.26    .34  10.74
0.00     .23    .11   3.66   30.63    .34    .80    .11   1.71    .80  38.40
 .11     .11   0.00   0.00    0.00    .34   0.00    .11    .23    .23   1.14
0.00    0.00   0.00    .34     .57    .11    .80   0.00    .34    .34   2.51
0.00     .57   1.49    .69     .57   0.00    .11    .91    .23    .23   4.80
0.00    2.86   3.66    .91    2.51    .11    .23   0.00  10.29   1.94  22.51
0.00     .11   0.00    .57    1.03   0.00    .34   0.00   2.17   1.14   5.37
 .34    5.26   8.91  10.74   38.40   1.14   2.51   4.80  22.51   5.37
```

1 408

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	1.04	.83	.62	0.00	0.00	0.00	1.76	.10	4.35
0.00	.62	.41	1.45	2.18	.10	0.00	0.00	.31	.10	5.18
0.00	.52	0.00	2.49	.41	.41	.10	3.63	4.46	2.07	14.09
0.00	.21	0.00	3.52	20.41	.73	0.00	0.00	2.07	2.18	29.12
0.00	0.00	0.00	.52	.52	.73	.10	.62	.83	.73	4.04
0.00	0.00	0.00	.41	0.00	0.00	.21	0.00	.10	.10	.83
0.00	.83	1.76	.93	0.00	.21	0.00	2.69	0.00	.62	7.05
0.00	1.45	1.97	2.07	3.83	.93	.31	0.00	12.54	1.34	24.56
0.00	.73	0.00	1.87	1.14	.93	.10	.10	2.49	3.42	10.78
0.00	4.35	5.18	14.09	29.12	4.04	.83	7.05	24.56	10.78	

```
1    409

0.00    0.00     .13    0.00    0.00    0.00    0.00    0.00    0.00    0.00     .13
0.00     .13     .38     .38     .63     .25    0.00    0.00     .75     .63    3.13
0.00     .63     .50     .50    1.00    0.00    0.00    0.00    1.25     .13    4.01
0.00    0.00    0.00    1.13     .25     .13    0.00    0.00    5.13     .88    7.51
0.00     .38    0.00    1.38   15.77     .38    0.00    0.00    3.88    1.13   22.90
0.00    0.00    0.00     .25     .38     .50    0.00    0.00    1.25     .13    2.50
0.00    0.00    0.00     .13     .13     .13    0.00    0.00     .13     .13     .63
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
 .13    1.63    2.88    3.25    2.88     .88     .25    0.00   25.41    7.88   45.18
0.00 .38             .13     .50    1.88     .25     .38    0.00    7.38    3.13   14.02
 .13    3.13    4.01    7.51   22.90    2.50     .63    0.00   45.18   14.02
```

```
1    410

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .24    .60    .36   1.43   0.00   0.00    .35   1.31   0.00   4.29
0.00   1.43    .24   1.43   1.43   0.00    .24   0.00    .48    .24   5.48
0.00    .12   0.00   1.55    .12    .12    .12   3.21   5.00    .48  10.71
0.00    .36   0.00   4.05  33.69    .71    .60    .12   2.98    .83  43.33
0.00   0.00   0.00    .24    .36   1.07   0.00    .36    .24    .48   2.74
0.00    .24   0.00    .60    .36    .36   1.43   0.00    .71    .24   3.93
0.00    .71   1.55    .71    .95    .12   0.00    .36   0.00   0.00   4.40
0.00   1.07   2.98   1.19   4.17   0.00   1.31   0.00   3.33   1.55  15.60
0.00    .12   0.00    .60   1.07    .36    .24   0.00   1.55   5.36   9.29
0.00   4.29   5.36  10.71  43.57   2.74   3.93   4.40  15.60   9.17
```

1 411

0.00	0.00	0.00	.13	0.00	0.00	0.00	0.00	0.00	0.00	.13
0.00	0.00	1.40	1.40	.13	.25	0.00	.13	.76	.38	4.44
0.00	.63	1.40	1.78	1.02	0.00	0.00	.13	.63	0.00	5.58
0.00	0.00	0.00	3.95	.25	.25	0.00	4.31	8.88	.89	18.53
0.00	.13	0.00	1.52	6.35	.51	0.00	.13	1.27	.51	10.41
0.00	0.00	0.00	.13	.25	.25	0.00	.51	1.14	.25	2.54
0.00	0.00	0.00	0.00	.13	0.00	0.00	.13	.38	.13	.76
0.00	1.65	1.65	1.65	0.00	.13	0.00	9.01	.63	1.90	16.62
.13	1.78	.89	6.60	1.65	.89	.63	.25	10.66	6.09	29.57
0.00	.25	.25	1.40	.76	.25	.13	2.03	5.20	1.14	11.42
.13	4.44	5.58	18.53	10.53	2.54	.76	16.62	29.57	11.29	

1 412

0.00	.11	0.00	.11	0.00	0.00	0.00	0.00	0.00	0.00	.22
.11	.11	1.32	1.43	.55	0.00	0.00	.33	1.65	.33	5.82
0.00	1.21	2.20	3.41	3.08	.11	.22	.11	.55	1.21	12.09
0.00	0.00	0.00	3.19	.22	.11	.33	3.69	8.02	1.43	17.25
0.00	.44	.22	2.36	11.65	.11	.44	.11	1.54	.99	18.35
0.00	0.00	0.00	0.00	.11	.22	0.00	.33	.44	.11	1.21
0.00	.11	.11	1.10	.11	.33	1.43	0.00	.66	.44	4.29
0.00	.88	1.98	.66	.33	.11	.22	.55	.22	.44	5.38
.11	2.86	5.93	2.31	1.54	.11	.38	0.00	3.30	1.43	18.46
0.00	.11	.33	2.20	.77	.11	.77	0.00	2.09	10.55	16.92
.22	5.82	12.09	17.25	18.35	1.21	4.29	5.38	18.46	16.92	

```
1    413

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00     .13     .91     .65     .65     .13    0.00     .52     .26     .52    3.77
0.00     .78     .78    3.64    2.34    0.00    0.00     .26     .52     .52    8.83
0.00     .13    0.00    1.69     .52     .13    0.00   10.00    1.82    2.08   16.36
0.00     .65    0.00    4.94   10.65     .65     .13     .91    1.95    2.99   22.86
0.00    0.00    0.00     .39     .13     .39    0.00     .52    0.00     .52    1.95
0.00     .13    0.00     .13    0.00    0.00    0.00     .26    0.00     .26     .78
0.00     .65    5.71    2.21    2.47     .39     .39    6.62     .26    2.86   21.56
0.00    1.17    1.30     .91    2.08    0.00     .26    0.00    1.43    1.82    8.96
0.00     .13     .13    1.82    4.03     .26    0.00    2.60    2.73    3.25   14.94
0.00    3.77    8.83   16.36   22.86    1.95     .78   21.69    8.96   14.81
```

THIRD SEMESTER

INDIVIDUAL TEACHER MATRICES

```
1     101

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .82    .70    .35    .82    .23   0.00    .70   1.64    .59   5.87
0.00    .82   1.76   1.29    .70   0.00   0.00    .12    .12    .12   4.93
0.00    .82    .12   1.41    .70    .12   0.00   0.00   1.64    .70   5.52
0.00    .59   0.00    .82   5.87    .82   0.00    .23    .47   1.53  10.33
0.00    .12   0.00    .23    .12    .47    .23    .23    .23   1.53   3.17
0.00   0.00   0.00   0.00    .23    .35    .23   0.00   0.00   1.06   1.88
0.00    .59    .35    .12    .12    .23   0.00  26.06    .23   1.06  28.76
0.00   1.06   2.00    .47    .12   0.00   0.00    .12   4.93   2.46  11.15
0.00    .94   0.00    .82   1.64    .94   1.41   1.41   1.88  19.37  28.40
0.00   5.75   4.93   5.52  10.33   3.17   1.88  28.87  11.15  28.40
```

```
1     102

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   0.00    .08    .08   0.00   0.00    .08    .71   0.00    .95
0.00    .24   2.22    .95   1.59   0.00    .16    .16    .24    .08   5.63
0.00   0.00   0.00  10.08    .16   0.00    .08   5.40    .56    .63  16.90
0.00    .48    .16   3.73  39.92    .24    .56    .08    .71    .63  46.51
0.00    .08   0.00   0.00    .08    .48   0.00   0.00    .08    .08    .79
0.00   0.00    .08    .16    .40   0.00    .63   0.00   0.00    .48   1.75
0.00   0.00   2.70   1.51   1.67   0.00    .08   8.65   0.00    .08  14.68
0.00    .08    .48    .16   1.43    .08   0.00   0.00   4.29    .08   6.59
0.00    .08   0.00    .24   1.19   0.00    .24    .32   0.00   4.13   6.19
0.00    .95   5.63  16.90  46.51    .79   1.75  14.68   6.59   6.19
```

1 103

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1.25	1.14	1.45	.93	.42	0.00	1.87	2.28	.52	9.87
0.00	1.25	1.14	1.35	.83	0.00	0.00	.31	.21	.83	5.92
0.00	1.87	0.00	1.14	.52	1.14	.21	1.25	2.70	1.25	10.07
0.00	.52	0.00	1.87	7.58	.21	.21	0.00	1.14	.93	12.46
0.00	.21	0.00	.52	.52	.73	.21	.62	.42	1.04	4.26
0.00	.31	0.00	.10	.10	0.00	.21	0.00	.10	1.04	1.87
0.00	1.35	.83	1.14	0.00	.31	0.00	20.15	.42	.62	24.82
0.00	2.28	2.70	1.45	.52	0.00	.21	.10	4.05	2.08	13.40
0.00	.83	.10	1.04	1.45	1.45	.83	.52	2.08	9.03	17.34
0.00	9.87	5.92	10.07	12.46	4.26	1.87	24.82	13.40	17.34	

```
1    104

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    1.52    1.52    1.63     .12    0.00     .35     .58     .12    5.83
0.00     .58    1.28    1.63    1.17    0.00    0.00     .12    0.00    0.00    4.78
0.00    0.00    0.00     .58    0.00    0.00    0.00    6.65    4.43     .47   12.14
0.00    0.00    0.00    4.43   23.45    1.40    0.00     .23    1.28     .58   31.39
0.00    0.00    0.00     .23    1.28    1.05    0.00     .47     .23     .47    3.73
0.00    0.00    0.00    0.00     .12    0.00    0.00    0.00    0.00    0.00     .12
0.00    3.27    1.40    1.63     .82     .12    0.00   10.85    0.00     .82   18.90
0.00    1.98     .58     .93    2.57     .35     .12    0.00    8.87     .47   15.87
0.00    0.00    0.00    1.17     .35     .70    0.00     .23     .47    4.32    7.23
0.00    5.38    4.78   12.14   31.39    3.73     .12   18.90   15.87    7.23
```

```
1     105

0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00     0.00
0.00     0.00     0.00     0.00      .36     0.00     0.00     0.00     2.23     0.00     2.59
0.00      .18      .98      .80      .98     0.00     0.00      .09      .18      .09     3.30
0.00     0.00     0.00     2.95     0.00     0.00     0.00     5.80      .09      .27     9.11
0.00     1.52     0.00     2.86    52.23      .18      .09      .09     1.25      .45    58.66
0.00     0.00     0.00     0.00      .18      .18     0.00      .09     0.00     0.00      .45
0.00     0.00     0.00     0.00     0.00     0.00      .36     0.00      .09      .09      .54
0.00      .27     1.88     1.61     2.23     0,00     0.00     7.41     0.00      .18    13.57
0.00      .63      .45      .34     2.05     0.00      .09     0.00     5.80      .18     9.64
0.00     0.00     0.00      .45      .63      .09     0.00      .09     0.00      .89     2.14
0.00     2.59     3.30     9.11    58.66      .45      .54    13.57     9.64     2.14
```

```
1    106

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .14   1.14    .43    .57   0.00   0.00    .29    .57    .43   3.57
0.00    .29   1.86    .43   1.71   0.00   0.00    .14    .14    .14   4.71
0.00   0.00   0.00   1.43    .43   0.00   0.00   3.00    .14   1.86   6.86
0.00    .43    .57   2.57  26.57    .86    .29    .43    .43    .29  32.43
0.00   0.00   0.00    .14    .57   1.14    .29    .29   0.00    .57   3.00
0.00   0.00   0.00   0.00    .14    .29    .43   0.00    .14    .43   1.43
0.00   1.43    .86    .43   1.00    .14   0.00  15.86    .29    .29  20.29
0.00    .86    .29   0.00    .71   0.00   0.00   0.00   3.86    .14   5.86
0.00    .43   0.00   1.43    .71    .57    .43    .29    .29  17.71  21.86
0.00   3.57   4.71   6.86  32.43   3.00   1.43  20.29   5.86  21.86
```

1 10

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	.11	3.26	.56	.34	0.00	0.00	0.00	0.00	0.00	4.27
0.00	.11	.11	2.14	3.37	0.00	0.00	0.00	.11	0.00	5.85
0.00	.11	0.00	1.69	0.00	0.00	0.00	5.62	1.57	1.24	10.24
0.00	0.00	0.00	3.94	50.96	.34	0.00	0.00	1.12	.45	56.81
0.00	0.00	0.00	.11	.45	.22	0.00	.11	0.00	0.00	.90
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	3.37	2.02	.34	0.00	0.00	0.00	7.65	0.00	.22	13.61
0.00	.56	.45	.56	1.35	0.00	0.00	.11	2.81	.22	6.07
0.00	0.00	0.00	.90	.34	.34	0.00	.11	.45	.11	2.25
0.00	4.27	5.85	10.24	56.81	.90	0.00	13.61	6.07	2.25	

```
1    108
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00     .18    1.07     .71    0.00    0.00     .09    1.16     .09    3.30
0.00    1.07    2.95    4.55    1.07     .09    0.00     .36     .18    1.16   11.43
0.00    0.00    0.00    5.89     .09    0.00     .09   14.82     .36     .71   21.96
0.00     .54     .18    3.75   12.32     .36    0.00     .80     .45     .63   19.02
0.00    0.00    0.00     .09     .09     .63    0.00     .45     .09    0.00    1.34
0.00    0.00    0.00     .09    0.00    0.00     .09    0.00    0.00    0.00     .18
0.00    1.52    7.68    4.38    2.50     .09    0.00   12.77     .36     .27   29.55
0.00     .09     .36     .80    1.25    0.00    0.00    0.00    3.39     .27    6.16
0.00     .09     .09    1.34     .98     .18    0.00     .27     .18    3.39    7.05
0.00    3.30   11.34   21.96   19.02    1.34     .18   29.55    6.16    7.05
```

```
1    109

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00    .61    .92    .92   0.00   0.00    .51    .92    .10   3.98
0.00   1.33    .92   1.22   3.37    .10    .10    .41    .51   0.00   7.96
0.00   0.00   0.00   5.10    .41   0.00    .20   6.53   2.45    .61  15.31
0.00    .20   0.00   4.80  34.29   1.02    .41    .31   1.53    .82  43.37
0.00   0.00   0.00    .10   0.00    .71   0.00   1.73    .71    .10   3.37
0.00   0.00   0.00    .20    .20    .31    .51    .10    .10    .10   1.53
0.00   1.02   4.18   1.53   1.73    .82    .20   1.63    .20    .31  11.63
0.00   1.43   2.24   1.02   1.84    .10    .10    .10   1.94    .41   9.18
0.00   0.00   0.00    .41    .61    .31   0.00    .31    .82   1.22   3.67
0.00   3.98   7.96  15.31  43.37   3.37   1.53  11.63   9.18   3.67
```

```
1    110

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00     .18    0.00     .18     .71    0.00    0.00     .18    2.86    0.00    4.11
0.00     .18    0.00     .54     .54    0.00    0.00    0.00    0.00     .18    1.43
0.00    0.00    0.00    3.57    0.00     .18    0.00    9.29     .54     .89   14.46
0.00    1.43    0.00    4.11   28.21     .18    0.00     .54     .89     .54   35.89
0.00    0.00    0.00     .18    0.00    0.00    0.00     .36    0.00     .18     .71
0.00    0.00    0.00     .18    0.00    0.00    0.00    0.00    0.00    0.00     .18
0.00    1.61    1.25    3.93    3.21     .18    0.00   15.00    0.00     .54   25.71
0.00     .71     .18     .54    2.32    0.00    0.00    0.00    8.57     .54   12.86
0.00    0.00    0.00    1.25     .89     .18     .18     .37    0.00    1.79    4.64
0.00    4.11    1.43   14.46   35.89     .71     .18   15.71   12.86    4.64
```

1 111

.24	0.00	0.00	0.00	.36	0.00	0.00	0.00	.12	0.00	.71
0.00	.12	.83	.60	.83	0.00	0.00	.83	1.07	3.45	7.74
0.00	.95	2.74	2.26	4.17	0.00	0.00	.24	.24	0.00	10.60
0.00	.60	.24	2.26	.36	0.00	0.00	6.55	2.14	.60	12.74
.12	1.79	.48	4.64	27.50	0.00	0.00	.12	3.10	.12	37.86
0.00	0.00	0.00	0.00	0.00	0.00	.12	0.00	0.00	0.00	.12
0.00	.12	0.00	.12	0.00	0.00	0.00	.12	.12	0.00	.48
0.00	1.90	4.05	1.07	.48	0.00	.12	3.10	.12	.60	11.43
.24	1.43	2.14	.36	2.74	0.00	.24	0.00	2.86	1.43	11.43
.12	.83	.12	1.43	1.43	.12	0.00	.48	1.67	.71	6.90
.71	7.74	10.60	12.74	37.86	.12	.48	11.43	11.43	6.90	

```
1     112

 .11     .11    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00     .22
0.00     .78     .67     .78    1.23    0.00    0.00    0.00    1.67     .56    5.96
0.00    1.11    1.56     .56    3.12    0.00    0.00     .22     .67     .56    7.80
0.00     .45    0.00    1.11     .78     .11    0.00    1.34    2.56    2.23    8.58
 .11     .67    0.00    3.34   28.43    0.00    0.00     .11    2.45    1.11   36.23
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00     .11     .11     .22
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00     .11     .78     .56     .11    0.00    0.00    .245     .11    0.00    4.12
0.00    1.90    4.46    1.11     .56     .11    0.00    0.00   10.48     .67   19.29
0.00     .56     .33    1.11    2.01    0.00    0.00    0.00    1.23   12.60   17.84
 .22    5.69    7.80    8.58   36.23     .22    0.00    4.12   19.29   17.84
```

1 113

0.00	0.00	0.00	0.00	.09	0.00	0.00	0.00	0.00	0.00	.09
0.00	0.00	1.35	.36	.54	0.00	0.00	.18	.09	0.00	2.52
0.00	.63	.45	2.96	4.40	0.00	0.00	.09	.45	0.00	8.98
0.00	0.00	0.00	1.62	0.00	0.00	0.00	6.74	3.68	2.07	14.11
0.00	0.00	0.00	6.47	42.41	.09	0.00	0.00	.81	.18	49.96
0.00	0.00	0.00	.09	.09	0.00	0.00	.36	.36	.09	.99
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	1.35	4.85	.72	.54	.45	0.00	3.59	0.00	0.00	11.50
.09	.54	2.34	.72	1.62	.36	0.00	0.00	3.32	.09	9.07
0.00	0.00	0.00	1.17	.27	.09	0.00	.54	.36	.36	2.79
.09	2.52	8.98	14.11	49.96	.99	0.00	11.50	9.07	2.79	

```
1     201

 .63   0.00   0.00   0.00   0.00   0.00    .13   0.00   0.00   0.00    .76
0.00    .13   0.00    .25    .13   0.00   0.00    .38    .50    .63   2.02
0.00    .38    .38   3.15    .13   0.00    .13    .13    .13   1.26   5.68
0.00   .13     .13   8.70    .25   0.00    .50   6.94   2.02    .38  19.04
0.00    .13   0.00    .88   2.40   0.00    .50    .13    .63    .38   5.04
0.00   0.00   0.00   0.00   0.00   0.00   0.00    .13   0.00    .25    .38
 .13    .13   0.00   1.01    .25   0.00  17.15   0.00   4.16    .63  23.46
0.00    .50   4.67    .88    .13   0.00    .38    .76    .13   1.13   8.58
0.00    .63    .38   1.01   1.51   0.00   4.04   0.00   5.93   2.65  16.14
0.00   0.00    .13   3.15    .25    .38    .63    .13   2.65  11.60  18.92
 .76   2.02   5.67  19.04   5.04    .38  23.46   8.58  16.14  18.92
```

```
1     202

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    3.79    2.82     .61    0.00    0.00    0.00    0.00    0.00    7.22
0.00     .12    0.00    1.96    2.82     .61    0.00     .24    0.00     .12    5.88
0.00    0.00    0.00    3.43     .24     .49    0.00    7.47    3.67    3.06   18.36
0.00    0.00    0.00    5.39   23.13    0.00     .12    0.00     .37     .24   29.25
0.00    0.00    0.00     .49     .24    0.00    0.00    1.47     .98    0.00    3.18
0.00    0.00    0.00     .12    0.00    0.00     .12    0.00     .12    0.00     .37
0.00    4.90    1.84    1.22     .24     .98    0.00   13.95    0.00    0.00   23.13
0.00    2.20     .24     .61    1.35     .73    0.00    0.00    3.18     .12    8.45
0.00    0.00    0.00    2.33     .61     .37     .12    0.00     .12     .61    4.16
0.00    7.22    5.88   18.36   29.25    3.18     .37   23.13    8.45    4.16
```

```
1    203

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00    .11   0.00    .11
0.00    .11   5.60   1.68   2.46   0.00   0.00   0.00    .67    .11  10.64
0.00    .22   1.79   2.69   4.37   0.00   0.00   0.00   1.01   0.00  10.08
0.00    .11   0.00   1.34    .45   0.00   0.00   7.39    .11   0.00   9.41
0.00    .22    .22   2.80   9.18    .11   0.00    .11   5.82    .22  18.70
0.00   0.00   0.00   0.00    .22    .22   0.00   0.00   0.00    .11    .56
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
 .11   5.38    .78    .56    .34    .11   0.00  12.77    .11    .11  20.27
0.00   4.48   1.68    .22   1.46    .11   0.00   0.00  21.50   0.00  29.45
0.00    .11   0.00    .11    .22   0.00   0.00   0.00    .11    .22    .78
 .11  10.64  10.08   9.41  18.70    .56   0.00  20.27  29.45    .78
```

```
1    204

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .12    .71    .24   0.00   0.00   0.00    .12   3.57    .36   5.12
0.00    .48   3.21   1.43   1.67    .24    .24    .12   1.19    .12   8.69
0.00   0.00    .12   1.67   0.00    .12    .12   1.90   2.62    .36   6.90
0.00    .71    .95   1.90   5.36    .12   0.00   0.00   1.43   0.00  10.48
0.00    .12   0.00    .24   0.00    .36    .12    .12   1.07   0.00   2.02
0.00   0.00    .12   0.00   0.00    .12    .36   0.00    .60    .12   1.31
0.00    .36    .48    .24    .48   0.00   0.00    .12    .48    .36   2.50
0.00   3.21   2.74   1.07   2.74    .95    .24   0.00  31.43   8.93  51.31
0.00    .12    .36    .12    .24    .12    .24    .12   8.93   1.43  11.67
0.00   5.12   8.69   6.90  10.48   2.02   1.31   2.50  51.31  11.67
```

```
1      206

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   6.84   1.26    .74    .11   0.00    .11    .11   0.00   9.16
0.00    .74    .42   7.68   4.63    .11   0.00    .11    .21    .32  14.21
0.00   0.00   0.00   2.32   0.00   0.00   0.00  10.21   8.11   1.26  21.89
0.00   0.00   0.00   6.53  20.11    .32   0.00   0.00   0.00    .32  27.26
0.00   0.00   0.00    .32    .21    .21   0.00    .21    .21    .11   1.26
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   5.68   3.05   1.58    .21    .11   0.00   1.47   0.00   0.00  12.11
0.00   2.74   3.89   1.16    .53    .21   0.00   0.00   2.63    .11  11.26
0.00   0.00   0.00   1.05    .84    .21   0.00   0.00   0.00    .74   2.84
0.00   9.16  14.21  21.89  27.26   1.26   0.00  12.11  11.26   2.84
```

```
1    207

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .33   1.00    .67    .56   0.00   0.00    .22    .56    .33   3.67
0.00   1.00   1.89   1.00    .89   0.00   0.00    .11   1.89    .78   7.56
0.00    .22    .22    .78    .22   0.00   0.00    .56   4.67    .67   7.33
0.00    .22    .22   1.11  11.67    .22   0.00    .22   1.22   1.56  16.44
0.00   0.00   0.00   0.00    .11    .11   0.00    .11    .22   0.00    .56
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .11    .22    .33    .22   0.00   0.00   1.00    .11    .22   2.22
0.00   1.33   3.22   2.67   1.11    .22   0.00   0.00  22.67   7.11  38.33
0.00    .44    .78    .78   1.67   0.00   0.00   0.00   7.00  13.22  23.89
0.00   3.67   7.56   7.33  16.44    .56   0.00   2.22  38.33  23.89
```

```
 1    208

 0.00    0.00    0.00    0.00    0,00    0.00    0.00    0.00    0.00    0.00    0.00
 0.00     .63     .63    0.00     .42     .10    0.00     .31    1.45     .31    3.85
 0.00     .10    1.35     .52    1.46    0.00    0.00    0.00    1.04     .42    4.90
 0.00     .10     .10     .21     .31    0.00    0.00     .21    1.15     .52    2.60
 0.00     .21    0.00     .53   11.98     .21    0.00     .31    1.25     .63   15.21
 0.00     .10     .10    0.00     .10     .10    0.00     .21     .52     .52    1.67
 0.00    0.00    0.00    0.00    0.00     .21    0.00    0.00    0.00    0.00     .21
 0.00     .73     .10     .21    0.00    0.00     .10    8.23     .21     .73   10.31
 0.00    1.56    2.50     .83     .42     .10    0.00    0.00   31.35    5.31   42.08
 0.00     .42     .10     .21     .52     .94     .10    1.04    5.10   10.73   19.17
 0.00    3.85    4.90    2.60   15.21    1.67     .21   10.31   42.08   19.17
```

```
1    209

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00     .21     .41     .41     .21     .21    0.00    0.00    1.65    1.86    4.95
0.00     .21    2.27    6.60    1.44     .21    0.00    0.00    2.47     .21   13.40
0.00     .21    0.00    2.68     .41     .21    0.00    5.15   10.52     .41   19.59
0.00     .62     .21    2.68    2.47    0.00    0.00    0.00     .62     .21    6.80
0.00    0.00    0.00     .62    0.00    0.00    0.00    0.00     .21    0.00     .82
0.00     .21    0.00     .21    0.00    0.00    0.00    0.00     .41    0.00     .82
0.00    1.03    2.06    1.03     .41    0.00    0.00     .82    0.00    1.44    6.80
0.00    1.86    8.25    3.51    1.24     .21     .62     .21    8.25    8.45   32.58
0.00     .62     .21    1.86     .62    0.00     .21     .62    8.45    1.65   14.23
0.00    4.95   13.40   19.59    6.80     .82     .82    6.80   32.58   14.23
```

```
1   210

 .92     .10    0.00     .31    0.00     .10    0.00    0.00     .61     .10    2.14
 .20     .71     .82     .92     .61    0.00     .20     .31    3.37    1.02    8.16
0.00    1.22    1.12    1.73    1.94    0.00     .10    0.00     .71     .20    7.04
 .10     .41     .20    1.43     .20    0.00    0.00    2.65    5.31     .41   10.71
 .31     .20    0.00    2.35   10.92     .41     .10     .20    1.12     .10   15.71
0.00    0.00    0.00     .10    0.00     .10     .20     .20     .31     .31    1.22
0.00    0.00    0.00     .20     .31    0.00     .31    0.00     .61    0.00    1.43
0.00     .82    1.43     .61     .31    0.00    0.00    6.53     .41    2.55   12.65
 .51    4.49    3.37    2.45    1.12     .31     .51     .10   17.45    2.24   32.55
 .10     .20     .10     .61     .31     .31    0.00    2.65    2.65    1.43    8.37
2.14    8.16    7.04   10.71   15.71    1.22    1.43   12.65   32.55    8.37
```

```
1    211

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00     .25     .50     .25     .25    0.00     .25    0.00    2.26     .25    4.02
0.00    1.01     .50     .25     .75    0.00    0.00    0.00    3.77     .75    7.04
0.00    0.00    0.00    0.00     .25    0.00     .50    1.26    1.76    1.76    5.53
0.00    0.00    0.00    1.51    6.28     .25     .50    0.00    2.26    2.26   13.07
0.00    0.00    0.00    0.00     .50     .50     .25     .25     .75     .50    2.76
0.00     .25    0.00     .25    0.00     .50    1.01    0.00     .75    1.01    3.77
0.00    0.00     .75     .50     .25    0.00    0.00    1.51     .25     .25    3.52
0.00    1.76    5.28    1.01    2.01     .75    0.00    0.00   18.84    6.03   35.68
0.00     .75    0.00    1.76    2.76     .75    1.26     .50    5.03   11.81   24.62
0.00    4.02    7.04    5.53   13.07    2.76    3.77    3.52   35.68   24.62
```

```
  1    212

   .120.00       0.00   0.00    .25   0.00   0.00   0.00   0.00   0.00    .37
  0.00    .25     .12    .37    .75   0.00   0.00    .12    .12   0.00   1.74
  0.00    .75     .25    .37    .99   0.00   0.00    .87    .12    .12   3.48
   .12   0.00     .12    .87    .99    .12   0.00    .25    .75   1.99   5.22
   .12   0.00    0.00   2.73  24.60    .12   0.00    .12    .12   1.74  29.57
  0.00   0.00    0.00   0.00    .12    .12   0.00    .12   0.00    .50    .87
  0.00   0.00    0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
  0.00    .50    1.12    .12    .12    .12   0.00   6.34   0.00    .62   3.94
  0.00   0.00    1.74    .25    .25   0.00   0.00    .12   1.12    .87   4.35
  0.00    .25     .12    .50   1.49    .37   0.00    .99   2.11  39.63  45.47
   .37   1.74    3.48   5.22  29.57    .87   0.00   3.94   4.35  45.47
```

```
1     302

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00    .16   0.00    .16    .32   0.00   0.00   0.00   1.83    .24   2.70
0.00    .48    .63   1.75   2.06   0.00   0.00   0.00    .08    .79   5.79
0.00   0.00   0.00   4.84   0.00   0.00   0.00   8.25    .24    .56  13.89
0.00   1.27    .08   4.05  35.16    .24    .08   0.00    .71   1.67  43.25
0.00   0.00   0.00    .08   0.00    .32   0.00   0.00   0.00    .40    .79
0.00    .08   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00    .08
0.00    .32   4.68    .95   2.06    .16   0.00   2.86    .16   0.00  11.19
0.00    .24    .40    .48   2.06   0.00   0.00   0.00   7.46   0.00  10.63
0.00    .16   0.00   1.59   1.59    .08   0.00    .08    .16   8.02  11.67
0.00   2.70   5.79  13.89  43.25    .79    .08  11.19  10.63  11.67
```

```
1    303

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   1.72    .86   1.48   0.00   0.00    .12    .12   0.00   4.31
0.00    .12   0.00    .37   1.97   0.00   0.00   0.00   0.00   0.00   2.46
0.00   0.00   0.00    .86   0.00   0.00   0.00   5.30    .99    .49   7.64
0.00   0.00   0.00   3.94  42.98   1.23   0.00    .37   5.42    .25  54.19
0.00   0.00   0.00   0.00    .86    .49   0.00    .37    .25    .12   2.09
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   2.69    .74    .49    .99    .12   0.00   9.61    .12   0.00  15.76
0.00    .49   0.00    .62   5.67    .25   0.00   0.00   5.17    .25  12.44
0.00   0.00   0.00    .49    .25   0.00   0.00   0.00    .37   0.00   1.11
0.00   4,31   2.46   7.64  54.19   2.09   0.00  15.76  12.44   1.11
```

```
1    304

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00    .29   0.00    .29
0.00    .15    .15    .73   1.02    .15    .15    .88   2.05   1.46   6.73
0.00   2.93    .44   1.02   1.32    .29    .15    .15    .44   0.00   6.73
0.00   0.00   0.00    .73    .15   0.00   0.00   3.22   4.25   1.02   9.37
 .15    .59    .15   2.64   3.66   1.17    .44    .29    .88    .15  10.10
0.00   0.00   0.00    .44    .59    .88    .29    .73    .88   1.61   5.42
0.00   0.00   0.00    .15    .59   0.00    .44    .29    .29    .44   2.29
0.00    .88   1.46   1.32    .88    .44   0.00   5.71    .29  10.54  21.52
 .15   1.46   4.39   1.17    .44   1.17    .15   0.00   2.05   2.64  13.62
0.00    .73    .15   1.17   1.46   1.32    .59  10.25   2.20   6.15  24.01
 .29   6.73   6.73   9.37  10.10   5.42   2.20  21.52  13.62  24.01
```

```
1    305

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00     .08     .16    0.00    0.00    0.00     .16     .16    0.00     .56
0.00    0.00    4.44    2.14     .95    0.00    0.00     .08    0.00     .24    7.86
0.00    0.00     .16   12.30     .08    0.00     .08   11.35     .32     .40   24.68
0.00     .08     .08    3.41   14.84    0.00    0.00     .08     .08     .16   18.73
0.00    0.00    0.00    0.00    0.00    0.00    0.00     .08    0.00    0.00     .08
0.00    0.00    0.00     .08    0.00    0.00    0.00    0.00    0.00    0.00     .08
0.00     .40    3.10    5.63    2.14     .08    0.00   32.78     .08     .40   44.60
0.00     .08    0.00     .16     .40    0.00    0.00    0.00    1.27    0.00    1.90
0.00    0.00    0.00     .79     .32    0.00    0.00     .08    0.00     .32    1.51
0.00     .56    7.86   24.68   18.73     .08     .08   44.60    1.90    1.51
```

```
1     306

0.00   0.00   0.00   0.00    .14   0.00   0.00   0.00   0.00   0.00    .14
 .14    .29    .14   1.29   1.00   0.00    .14    .14   1.71    .71   5.57
0.00   1.86   2.00   2.00   2.29    .14    .14   0.00    .86   0.00   9.29
0.00    .14   0.00   2.00   1.00   0.00    .14   4.71   5.34    .71  14.14
0.00    .57    .43   4.57  30.86    .86   1.14    .43   1.00    .14  40.00
0.00   0.00   0.00    .43    .43    .14    .29   0.00    .39   0.00   1.57
0.00   0.00    .14    .29   1.29    .29    .71    .14    .57    .14   3.57
0.00    .14   2.57   1.57    .71   0.00    .29    .29    .14    .14   5.86
0.00   2.43   4.00   1.29   1.86    .14    .57   0.00   5.29    .71  16.29
0.00    .14   0.00    .71    .43   0.00    .14    .14   1.00   1.00   3.57
 .14   5.57   9.29  14.14  40.00   1.57   3.57   5.86  16.29   3.57
```

```
1     307

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00    0.00     .08    0.00    0.00    0.00    2.38    0.00    2.46
0.00     .24    1.19    1.67    1.19    0.00    0.00     .16     .24     .48    5.16
0.00     .08    0.00    8.73     .08    0.00    0.00    6.59     .87    1.27   17.62
0.00    1.27     .32    4.05   34.05     .08    0.00     .08    1.67    1.11   42.62
0.00    0.00    0.00    0.00    0.00     .08    0.00     .08    0.00    0.00     .16
0.00    0.00    0.00     .08    0.00    0.00    0.00    0.00    0.00    0.00     .08
0.00     .32    3.02    1.11    2.46    0.00     .08    4.52     .08     .32   11.90
0.00     .32    0.00    1.51     .79    0.00    0.00     .48     .16    3.10    6.35
0.00    2.46    5.16   17.62   42.54     .16     .08   11.90   13.65    6.43
```

```
1    308

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    0.00     .08    0.00    0.00    0.00     .23    2.58     .08    2.96
0.00     .08     .38     .46     .30    0.00    0.00     .15    0.00     .30    1.67
0.00    0.00    0.00    3.49     .15     .08     .15    7.29     .08    1.06   12.30
0.00     .99    0.00    2.89   15.41     .30     .30     .08    1.21    1.14   22.32
0.00     .08    0.00     .23    0.00     .38    0.00     .23     .08     .08    1.06
0.00     .08    0.00     .23     .30     .15     .68     .08     .08     .08    1.67
0.00     .76    1.29    3.49    1.90    0.00     .38   20.88     .15     .84   29.69
0.00     .46    0.00     .46    3.11     .08     .08     .08   14.88     .61   19.74
0.00     .53    0.00     .99    1.14     .08     .08     .68     .68    4.40    8.58
0.00    2.96    1.67   12.30   22.32    1.06    1.67   29.69   19.74    8.58
```

J 309

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	1.35	.62	.86	0.00	0.00	0.00	.12	0.00	2.95
0.00	.12	0.00	1.60	2.34	0.00	0.00	0.00	0.00	0.00	4.06
0.00	0.00	0.00	.25	0.00	0.00	0.00	6.15	3.44	.62	10.46
0.00	0.00	0.00	5.17	40.59	2.09	.12	.12	1.11	.86	50.06
0.00	0.00	0.00	1.23	1.35	1.11	0.00	0.00	.37	.49	4.55
0.00	0.00	0.00	0.00	.12	.12	.12	0.00	0.00	0.00	.37
0.00	2.34	2.71	.74	.12	0.00	0.00	1.48	0.00	.37	7.75
0.00	.49	0.00	.62	3.69	.37	0.00	0.00	2.21	.12	7.50
0.00	2.95	4.06	10.46	50.05	4.55	.37	7.75	7.50	4.31	

1 311

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	.16	.24	.16	0.00	0.000	0.00	.40	.16	1.11
0.00	.24	0.00	.16	.32	0.00	.16	0.00	0.00	.16	1.03
0.00	0.00	0.00	3.33	.16	.08	.08	3.65	.24	.24	7.78
0.00	.08	0.00	1.83	20.32	.48	.24	.16	.95	1.98	26.03
0.00	0.00	0.00	.08	.16	1.03	.24	.16	.08	.56	2.30
0.00	0.00	0.00	.16	.08	.16	2.78	0.00	.24	1.90	5.32
0.00	.56	.79	1.03	.87	0.00	.16	1.27	0.00	.79	5.48
0.00	0.00	.08	.16	2.06	0.00	.08	0.00	1.43	.40	4.21
0.00	.24	0.00	.79	1.90	.56	1.59	.24	.87	40.56	46.75
0.00	1.11	1.03	7.78	26.03	2.30	5.32	5.48	4.21	46.75	

```
1    401

  .09   0.00   0.00   0.00   0.00   0.00   0.00    .09   0.00   0.00    .17
 0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00    .69   0.00    .69
 0.00   0.00    .60   1.03   2.33   0.00   0.00   0.00    .09    .26   4.31
 0.00   0.00    .09   5.09    .09    .09   0.00   7.41    .09    .43  13.28
 0.00    .52    .09   3.79  55.69    .17    .09    .26    .86    .43  61.99
 0.00   0.00   0.00    .17    .09    .34   0.00   0.00   0.00    .09    .69
 0.00   0.00   0.00   0.00    .09   0.00   0.00   0.00   0.00   0.00    .09
  .09    .09   3.45   1.55   1.64   0.00   0.00   2.93    .26    .78  10.78
 0.00   0.00    .09    .43   1.47   0.00   0.00   0.00   2.59   0.00   4.57
 0.00    .09   0.00   1.21    .52    .09   0.00    .09   0.00   1.55   3.53
  .17    .69   4.31  13.28  61.90    .69    .09  10.78   4.57   3.53
```

```
1     402
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00    .24    .12    .12   0.00   0.00    .12    .12   0.00    .71
0.00   0.00   0.00   1.43   2.86    .12    .12   0.00   0.00   0.00   4.52
0.00    .12   0.00   1.79   1.07    .24   0.00   3.93   1.67    .36   9.17
0.00    .12    .36   4.64  55.36    .36   0.00    .28   1.31    .24  62.86
0.00   0.00   0.00    .24   0.00    .36    .12    .60    .12    .36   1.79
0.00   0.00   0.00   0.00    .24    .24    .12    .12   0.00    .36   1.07
0.00    .12   2.86    .48   1.55   0.00    .24   8.45   0.00   0.00  13.69
0.00    .36   1.07    .24   1.31    .12    .24   0.00    .36   0.00   3.69
0.00   0.00   0.00    .24    .36    .36    .24   0.00    .12   1.19   2.50
0.00    .71   4.52   9.17  62.86   1.79   1.07  13.69   3.69   2.50
```

```
1     404
0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   2.64   1.89    .88   0.00   0.00   0.00   0.00    .13   5.54
0.00    .63    .13   3.15   2.02    .25   0.00    .13   0.00    .38   6.68
0.00   0.00   0.00   3.53   0.00    .38   0.00   9.82   3.65   2.27  19.65
0.00   0.00   0.00   5.54  24.56    .88    .25   0.00   1.64    .38  33.25
0.00   0.00   0.00   2.14   1.13   2.52    .50   0.00    .76    .38   7.43
0.00   0.00   0.00    .38    .50    .63    .38   0.00    .13   0.00   2.02
0.00   4.66   3.78    .88    .13    .13    .13    .88   0.00    .25  10.83
0.00    .25    .13   1.01   3.53    .76    .63   0.00   1.39    .13   7.81
0.00   0.00   0.00   1.13    .50   1.89    .13   0.00    .25   2.90   6.80
0.00   5.54   6.68  19.65  33.25   7.43   2.02  10.83   7.81   6.80
```

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	2.24	2.58	1.12	.67	0.00	.34	0.00	0.00	6.96
0.00	.67	.11	3.37	1.23	.22	0.00	.11	0.00	.22	5.95
0.00	0.00	0.00	2.92	0.00	.56	0.00	9.76	3.14	1.23	17.62
0.00	0.00	0.00	3.59	16.50	.90	.34	.45	0.00	.45	22.22
0.00	0.00	0.00	.90	.67	1.57	.22	2.92	.56	.34	7.18
0.00	0.00	0.00	.67	.45	.34	.45	0.00	0.00	.11	2.02
0.00	5.61	2.92	1.80	1.01	1.91	.34	14.59	0.00	0.00	28.17
0.00	.67	.67	.90	.79	.22	.34	0.00	2.02	.11	5.72
0.00	0.00	0.00	.90	.45	.79	.34	0.00	0.00	1.68	4.15
0.00	6.96	5.95	17.62	22.22	7.18	2.02	28.17	5.72	4.15	

```
 1    406

0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00
0.00   0.00   0.00    .24   0.00    .47   0.00   0.00   1.65    .24   2.59
0.00    .24   2.35   1.41   1.65    .24    .24   0.00   1.41    .24   7.76
0.00   0.00   0.00    .24   0.00   0.00   0.00   2.82   3.53    .24   6.82
0.00    .71    .94   1.41   6.59    .24   0.00    .24   1.88    .24  12.24
0.00   0.00   0.00   0.00   0.00    .71   0.00   2.59    .47   1.65   5.41
0.00   0.00    .47   0.00   0.00   0.00    .24   0.00    .47   0.00   1.18
0.00    .24    .71    .47    .94   1.65   0.00   2.12    .94    .94   8.00
0.00   1.18   2.82   2.35   2.35    .71    .47   0.00   9.88   7.06  26.82
0.00    .24    .47    .71    .71   1.41    .24    .24   6.59  18.59  29.18
0.00   2.59   7.76   6.82  12.24   5.41   1.18   8.00  26.82  29.18
```

```
1     407

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00     .08     .08    0.00    0.00    0.00     .08     .56     .24    1.03
0.00    0.00     .56     .32     .48    0.00    0.00     .08     .08    0.00    1.51
0.00    0.00     .08    2.86    0.00    0.00    0.00    3.17    0.00     .08    6.19
0.00     .48    0.00    1.43   64.29    0.00    0.00    0.00    1.35    1.03   68.57
0.00    0.00    0.00    0.00    0.00    0.00     .08    0.00     .08    0.00     .16
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00     .16     .16
0.00     .56     .71    1.11     .56    0.00    0.00    3.10     .08     .32    6.43
0.00    0.00     .08     .16    1.75     .08    0.00    0.00    8.49     .24   10.79
0.00    0.00    0.00     .24    1.51     .08     .08    0.00     .16    3.10    5.16
0.00    1.03    1.51    6.19   68.57     .16     .16    6.43   10.79    5.16
```

```
1    408

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0;00    0.00    0.00     .21    0.00    0.00     .41    0.00     .31     .82
0.00     .21    0.00     .41    1.65     .41    0.00    0.00     .21     .21    3.09
0.00    0.00    0.00    1.23     .21    0.00    0.00    2.88     .21    0.00    4.53
0.00    0.00    0.00    1.23   18.52    3.09     .41     .21     .62     .62   24.69
0.00    0.00    0.00    0.00     .62    4.32     .41    3.91     .41    2.47   12.14
0.00    0.00    0.00    0.00     .62     .41     .82     .82     .21    0.00    2.88
0.00     .41    2.67    1.44    1.85    1.03     .82   27.98    0.00    1.23   37.45
0.00     .21     .41     .21     .21     .21     .41    0.00     .21     .41    2.26
0.00    0.00    0.00    0.00     .82    2.67    0.00    1.23     .41    7.00   12.14
0.00     .82    3.09    4.53   24.69   12.12    2.88   37.45    2.26   12.14
```

```
1     409

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    0.00    3.28    1.36     .68     .23    0.00     .11    0.00    0.00    5.66
0.00     .57     .45    6.00    3.17    0.00    0.00     .11     .11    0.00   10.41
0.00    0.00    0.00    1.24    0.00    0.00    0.00   12.67    1.81     .45   16.18
0.00    0.00    0.00    4.64   31.11     .68    0.00     .11    1.47     .11   38.12
0.00    0.00    0.00     .23     .23     .34    0.00     .57     .11     .11    1.58
0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00    4.52    6.56    1.81     .34     .34    0.00    6.90    0.00    0.00   20.48
0.00     .57     .11     .45    2.38    0.00    0.00    0.00    3.39    0.00    6.90
0.00    0.00    0.00     .45     .23    0.00    0.00    0.00    0.00    0.00     .68
0.00    5.66   10.41   16.18   38.12    1.58    0.00   20.48    6.90     .68
```

```
1    410

0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
0.00     .43     .43     .22    2.17     .43    0.00    0.00    2.39    0.00    6.09
0.00    1.09    1.74    3.48    2.17     .43    0.00     .22    1.52     .43   11.09
0.00     .22    0.00     .87     .22    0.00    0.00    3.26    6.30     .43   11.30
0.00     .43     .65    4.13   21.96     .22     .22    0.00    1.74     .87   30.22
0.00    0.00     .22     .22    0.00    0.00    0.00     .65    1.09     .43    2.61
0.00     .22    0.00    0.00     .22    0.00     .22    0.00    0.00     .22     .87
0.00     .43    1.74     .43     .87     .43    0.00     .65    0.00     .43    5.00
0.00    3.04    5.87    1.52    1.96    1.09     .22     .22    6.52    2.83   23.26
0.00     .22     .43     .43     .65    0.00     .22    0.00    3.70    3.91    9.57
0.00    6.09   11.09   11.30   30.22    2.61     .87    5.00   23.26    9.57
```

```
   1     411

 0.00    0.00    0.00    0.00    0.00    0.00    0.00     .12    0.00    0.00     .12
 0.00    0.00     .24     .95     .24    0.00    0.00     .36     .60     .12    2.50
 0.00    1.31     .24    1.31    1.79    0.00     .60     .36     .60    0.00    6.19
 0.00    0.00    0.00     .95     .12     .36     .12    6.07    1.90     .83   10.36
 0.00    0.00     .24    3.81   21.19     .95     .60     .60     .71     .12   28.21
 0.00    0.00    0.00     .24     .24    2.26    0.00     .60     .36     .48    4.17
  .12    0.00    0.00     .83    1.19     .24    3.21     .12     .71     .24    6.67
 0.00     .36    3.57     .95    1.55     .12     .48   14.17     .71    1.55   23.45
 0.00     .71    1.90     .83    1.31    0.00     .71    0.00    3.69    1.79   10.95
 0.00     .12    0.00     .48     .60     .24     .95    1.07    1.67    2.26    7.38
  .12    2.50    6.19   10.36   28.21    4.17    6.67   23.45   10.95    7.38
```

APPENDIX D

INSTRUMENTS

THE OBSERVATIONAL TECHNIQUE OF INTERACTION ANALYSIS APPLIED TO THE CLASSROOM: PROCEDURES AND LIMITATIONS*

by

Edmund Amidon

Temple University

The system described here, the Flanders system of Interaction Analysis, has been utilized to discover some teacher-pupil relationships. In the Flanders system only verbal interaction between teachers and pupils is analyzed because of the difficulty in reliably categorizing non-verbal behavior. All teacher-pupil interaction is divided into ten categories: seven of teacher talk, two of student talk, and one of silence or confusion. Reference to the chart on page during the reading of the following section will assist the reader in obtaining the over-all picture of the categories described in this section.

Teacher talk is recorded under one of two major headings: (a) indirect influence, and (b) direct influence. Indirect influence contains four, and direct influence three, categories. Included under the classification of indirect teacher influence are those types of teacher statements which increase student freedom to respond. Direct teacher influence refers to statements which restrict response by students.

A closer look at the categories of indirect influence reveals the exact types of teacher statements included here. Category one, acceptance of feeling, contains teacher statements communicating acceptance by the teacher of both positive and negative student feelings. Statements which judge the "goodness" or appropriateness of pupil behavior comprise Category two. These may be either praise or encouragement. Category three, acceptance of ideas, is made up of teacher statements which reflect, summarize, or clarify student ideas. Teacher questions which require children's response are assigned to Category four.

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*(This paper was delivered at the American Educational Research Association, February 1963, in Chicago, Illinois.)

Categories of direct teacher influence reveal a contrasting type of teacher behavior. Lecture, giving information, and expressing opinion are recorded in Category five, and Category six is used for the teacher's directions to pupils. In Category seven are placed both statements of criticism and those in which the teacher justifies his authority. Such statements are usually designed to change pupil behavior.

Student talk is divided into only two categories---Category eight, which is student talk in response to the teacher, and Category nine, student talk initiated by the student.

In the remaining category are recorded periods of silence or confusion. Pauses, short periods of silence, and periods during which the observer cannot determine who is talking are included in this category. This category, number ten, is necessary because it allows the person who is doing the recording to account for every minute of the time spent in systematic observation.

A summary of the ten categories of interaction analysis with brief definitions can be found on page 38. There is NO scale implied by these numbers. Each number is classificatory; it designates a particular kind of communication event. To write these numbers down during observation is to enumerate, not to judge a position on a scale.

Procedure for Observing Teacher-Pupil Interaction

Use of the interaction analysis system involves an observer's spending several periods in a classroom observing various kinds of classroom interaction. The most typical procedure for collecting interaction data in research is presented in this section.

The observer enters the classroom and seats himself in a place where his presence will cause the least amount of distraction to the teacher and the class. He then spends from five to ten minutes observing without recording. During this time he is getting oriented to the classroom, acquiring a "feeling" for the total situation. This accomplished, he begins to record. Every three seconds he writes the category number of the teacher or student verbal behavior which he is observing at that moment. These numbers are recorded in sequence in a column. Since the observer writes approximately 20 numbers per minute, at the end of an observational period of 15 or 20 minutes he will have recorded several long columns of numbers. Accuracy of observation and recording is of prime importance, of course, but evenness of tempo is also vital. While the observer is recording the appropriate category numbers he often records marginal notes explaining unusual happenings in the classroom. These are helpful later in interpreting the material gathered.

The observer always notes the type of class activity being observed, since obviously interaction will vary from one activity to another. Whenever the classroom activity changes so that observing is inappropriate, as, for example, when the class members are working at their seats on individual work, or when silent reading is taking place, the observer stops recording. He then draws a line under the recorded numbers, makes a note of the new activity, and begins categorizing again when the total class interaction resumes.

Observer Training and Problems of Reliability

The degree of effectiveness of interaction analysis data in research depends upon the level of skill which observers can achieve during training. The first important step in observer training is a thorough understanding of the categories. Familiarity with the system must be such that transfer from the words to the number is automatic in the observer's mind. A teacher's question, for example, is perceived as a "four," rather than a question.

Typically, a training procedure for observers looks something like this. A small group of observers begins by categorizing together from tape recordings of classroom sessions. After this procedure has been followed on tapes of several kinds of classroom interaction, the observers divide into teams of two in order to analyze even more thoroughly and carefully recordings of teacher-pupil interaction in different subject areas and at various grade levels. The two observers may categorize a tape separately, then discuss any disagreements which they note upon comparison of their results. From six to ten hours of training with tapes are usually required before the observers are ready to move into the classroom.

Clearing the classification of every statement into one of the categories is not always accurate. Many questions arise concerning whether a statement belongs in one category or another. Ground rules about classifying statements, although not completely eliminating disagreement among observers, have been found helpful and necessary in many cases. Certain of these rules which appear to apply to a great number of teaching situations are discussed here. Use of these ground rules has been found to improve reliability. For a specific research project, however, an observer team may develop a list of special ground rules applicable only to that project.

Rule 1: When not certain in which of two or more categories a statement belongs, choose the category which is numerically farthest from category five. This is true except when one of the two categories in doubt is category ten, which is never chosen if there is an alternate category under consideration.

Rule 2: If the primary tone of the teacher's behavior has been consistently direct or consistently indirect, do not shift into the opposite classification unless a clear indication of shift is given by the teacher. The trained observer who is observing a particular action is in the best position to judge whether or not the teacher is restricting or expanding the freedom of action of class members.

Rule 3: The observer must not be concerned with his own biases or with the teacher's intent. Rather, he must ask himself the question, "What does this behavior mean to the pupils so far as restriction or expansion of their freedom is concerned?"

Rule 4: When a category change occurs, note it even though the three seconds are not used up, and start your three-second interval from the new tally. If no change occurs within the three-second interval, repeat the previous category number.

Observers who are considered to be ready for classroom observation need to be checked to determine the extent of the reliability of their observations. This reliability can be defined in terms of inter-observer reliability, that is, the agreement between two observers observing a period of classroom interaction (or a tape of that interaction) or in terms of self-reliability, agreement between recordings of two separate hearings of one taped session by a single observer. Use of the Scott coefficient* affords an approximation of observer agreement, although it does not reflect the extent to which two observers agree on the sequence of categories they have recorded. What the Scott coefficient does give is a general idea of the extent of agreement between two observers of the amount of a particular category a teacher employs. For training purposes, of course, the observers need to have as much information as possible about their progress. Higher Scott coefficients after increased practice indicate such progress. No method is yet available for dealing with the problem of the reliability of sequential ratings.

Discrepancies in observation between trained observers represent only a small fraction of the differences in teaching methods existing among teachers compared in a research project, so observer error is not responsible for most differences noted.

Description and Summary of Interaction Analysis Data

One of the problems in development of classroom observation techniques has been that of providing a means of taking care of the problem of sequence in behavior. The Flanders system of Interaction Analysis provides a procedure for partially dealing with this problem. As the reader will recall, the observer preserves the original sequence of classroom interaction by recording the category numbers in columns. The following example demonstrates an observer's classification of a short period of classroom interaction and then his summary of that data for later analysis.

A social studies lesson begins in a fourth grade. The observer, who has been sitting in the classroom for several minutes in order to gain some idea of the general climate, now starts to record.

Teacher: "Boys and girls, please open your social studies books to page 5."

Observer classifies this as a 6, followed by a 10, because of the period of silence and confusion during which the children find the right page.

Teacher: "Jimmy, we are all waiting for you. Will you please turn to page 5 in your book?"

Observer records a 7 and a 6.

Teacher: "I know now that some of you had difficulty with and were a little upset by this chapter yesterday, but I think that today we will find it more exciting and interesting."

Observer records two 1's, reacting to feeling.

Teacher: "Now has anyone had a chance to think about what we discussed yesterday?"

Observer records a 4.

Student: "I thought about this, and it seems that the reason that we are in so much trouble in southeast Asia is that we haven't really had a chance to learn to understand the ways of the people who live there."

Observer records three 8's.

Teacher: "Good, John. That is a very interesting point which I think we should examine more carefully."

Observer classifies this as a 2.

Thus the following sequence of numbers has been recorded by the observer in this fashion:

10)
6)
(10)
7)
(6)
1)
(1)
4)
(8)
8)
(8)
2)
(10

Notice that in the listing above the numbers have been marked off in overlapping pairs. The first pair is 10-6, the second 6-10, and the third 10-7, etc. The numbers are summarized by placement in 10 row by 10 column table called a matrix. A sample matrix for the interaction pattern just discussed is shown in Figure 1.

The cell in the matrix in which a pair is to be recorded is determined by using the first number in the pair to indicate the row, the second number for the column. Thus the pair 10-6 is shown by a tally in the cell formed by row 10 and column 6; the second pair, 6-10, in the cell formed by row 6 and column 10, etc. Notice that each pair of numbers overlaps the previous pair; therefore, each number, with the exception of the first and last, is used twice. For this reason a 10 is entered as both the first and the last number in the observation. Such a procedure permits the total of each column to equal the total for the corresponding row.

	1	2	3	4	5	6	7	8	9	10
1				1						
2										1
3										
4								1		
5										
6	1									1
7						1				
8		1						11		
9										
10						1	1			

Figure I
SAMPLE MATRIX

The tabulations in the matrix can be checked for accuracy by making certain that there is one less tally in the matrix than there were numbers entered in the observation record itself (N-1). In this case, because we began with 13 numbers, the total number of tallies in the matrix is 12.

Analyzing and Interpreting a Classroom Interaction Pattern

What actual knowledge about a classroom does an observer possess when he has completed a matrix such as the one described in the preceding section? In other words, how does he go about making sense from this maze of tallies and cells?

He may begin by comparing some percentages, such as the percentage of the total tallies which fall in each of the columns. Then he determines the percentage of total teacher talk which falls in each of the seven teacher categories. And lastly, he finds out what percentage of the total of student talk falls in each of categories eight and nine.

In order to discover whether the teacher is predominantly direct or indirect, the total number of tallies in columns 1, 2, 3, and 4 is divided by the total number of tallies in columns 5, 6, and 7 to find the "I/D Ratio," that is, the ratio of indirect to direct teacher statements. An I/D ratio of 1.0 means that for every indirect statement there was one direct statement; an I/D ratio of 2.0 means that for every two indirect statements there was one direct statement, etc.

Identification of individual cells in which there is a large accumulation of tallies, as well as possibly some cells in which there are few or no tallies is an important part of matrix analysis. Location of tallies or lack of tallies in groups of cells in specific parts of the matrix may be of even greater significance. Such groups of cells make up important areas of the matrix, which because of their importance are given special emphasis. These areas are discussed next in some detail. The reader will want to refer to the chart on page during this next section in order to locate the areas being considered.

Area A, called the content cross, contains tallies representing teacher statements consisting primarily of lecture, statements of opinion and ideas, and teacher questions concerning information and content presented. Thus a heavy concentration of tallies in this area indicates an emphasis on presentation of content.

The emphasis which the teacher gives to using student ideas, amplifying student contributions, and accepting and enlarging upon student feelings, is represented in Area B. It also includes stages of transition from one of these categories to the next. High frequency of tallies in this area indicates the use of extended indirect influence by the teacher.

Area C tallies suggest teacher emphasis on criticism and direction or on a shift from one to another of these types of influence. In general, tabulations in this area suggest extended direct influence on the part of the teacher, with a focus on the teacher's authority.

Examination of the tabulations which fall into Area D indicates the kind of teacher statements which tend to stimulate student talk, answering the question, "How do students in this classroom become involved in classroom interaction?"

Areas E and F are important because they reveal the manner in which the teacher responds to student talk, with Area E representing the indirect, and Area F the direct response. A comparison of the relative number of tallies in these two areas indicates whether a teacher is primarily indirect or direct when responding to student talk.

These groups of cells are not the only significant ones. While they have been very useful in affording a picture of classroom interaction, in some of the research concerned with identifying superior teaching, others have proved exceedingly significant.

Some Limitations of the System

Some of the more general overall limitations of use of

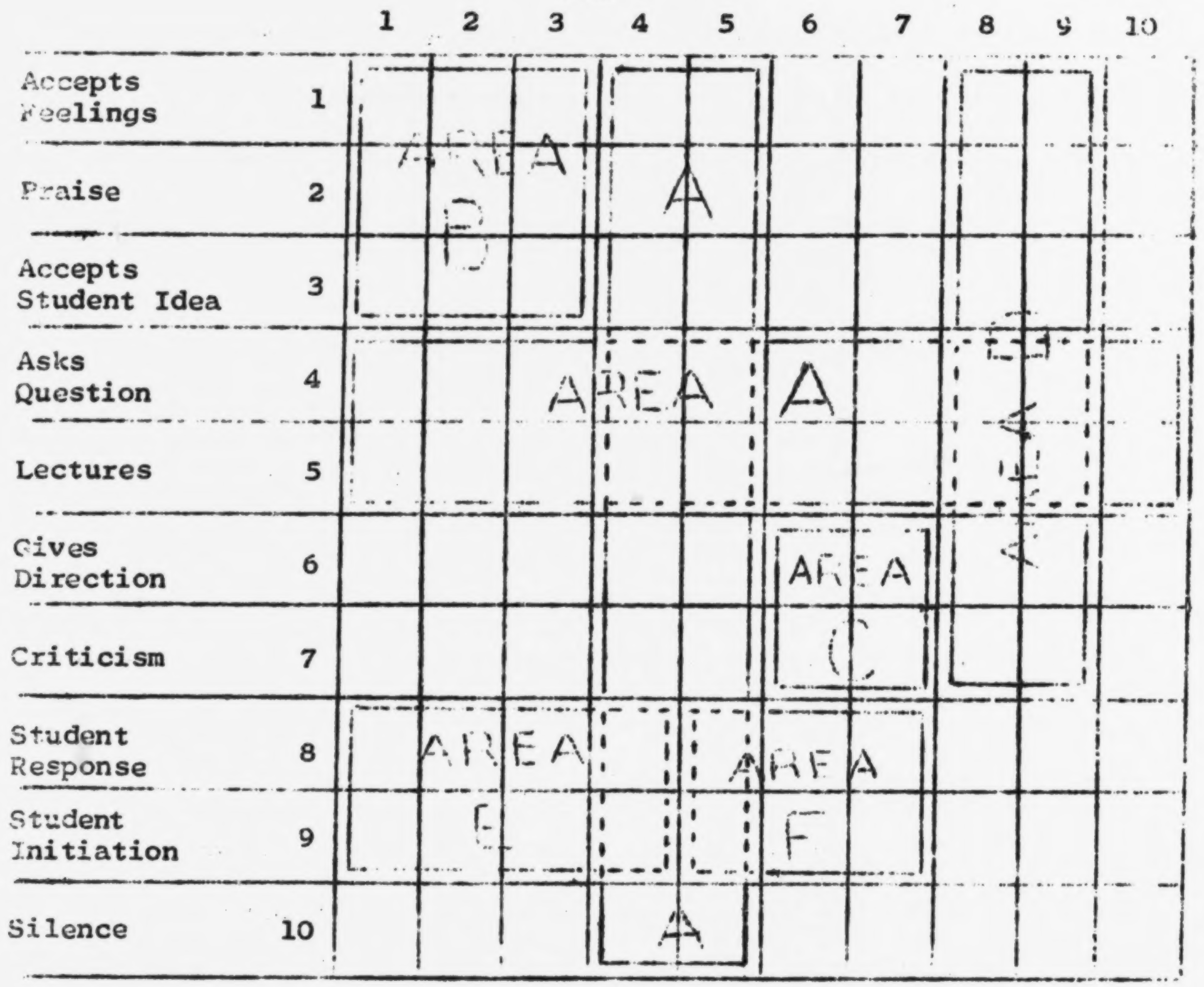

Figure II
AREAS IN MATRIX ANALYSIS

the Flanders system of Interaction Analysis are immediately evident. The system is designed for use only when the student and teacher are engaged in verbal interaction. This means that if for one reason or another the teacher is interacting in a non-verbal fashion with class members, no record is made of this interaction. Possibly in certain teaching situations this non-verbal communication is important enough to warrant attention. Further, when a teacher has the class broken into small groups in which he himself is not interacting with children, with all interaction being child to child, no effective observation is possible. If the teacher is interacting with one of the small groups, however, this group can be observed in much the same manner as would the total class. The system, moreover, cannot be utilized in situations in which the teacher is using audio-visual aids or other tools which make it unnecessary for him to talk.

Of the specific limitations inherent in the system, one in particular warrants attention here. Category 4 contains teacher questions--all types of questions requiring pupil response. No allowance is made for different types of questions; for example, those broad and those narrow in scope. Length of student response, indicated by several consecutive 8's, may reflect something about the kind of question, but specific information about teacher questioning is still lacking in the matrix. Likewise there is no specific indication about student response in terms of its correctness or incorrectness. Again, the ensuing response by the teacher may (or may not) suggest the correctness of the student's reply.

The categories contained in the system, although fairly inclusive concerning teacher talk are rather more limited in the area of student participation. Supposing, for example, one student questions another student. No indication is given in the matrix, except, of course, that many consecutive 9's indicative of prolonged student conversation, might lead an interpreter to guess that some questioning had indeed occurred. Anger on the part of the student, again, may not be revealed in the matrix, except that we might expect a teacher reprimand (7) or perhaps acceptance of feeling (1) to follow. In other words, no exact interpretation of much of student verbal behavior is provided for in the system.

The Flanders system of Interaction Analysis, although not "the final answer," appears to have great potential as a highly significant tool for research about the teacher-learning process. Certainly information about the verbal interaction of the classroom provides a great deal of insight into the climate of the classroom, and according to research some indication of how much subject matter and what kinds of attitude pupils are absorbing.

Educators who are considering use of this tool must ultimately base their decision concerning its use on the extent of the relationship existing between teachers' verbal interaction and pupil learning.

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TEACHING SITUATION REACTION TEST

Directions: The case example that follows has been planned to measure your ability to work through some of the problems of handling a classroom group. You will be given certain information about the classroom group and the working siutation. You will then be asked to respond to a number of questions. This will be repeated through several problem situations.

You are asked to indicate your first, second, third, and fourth choice under each question by inserting respectively the numbers 1, 2, 3, and 4, in the spaces provided on the answer sheets under (a), (b), (c), and (d). The most desirable choice should be labeled 1 and the least desirable 4. For example, if your first choice was response (c), your second choice was response (a), your third choice was response (b), and your fourth choice was response (d), you would record your responses on the answer sheet as follows:

(a)	(b)	(c)	(d)
2	3	1	4

Please do not write on the test booklet

The Situation:

You have been employed by a school system which is engaged in a series of experimental studies. One of these studies involves an experimental class designed to improve pupils' general adjustment to their environment. A heterogeneous group (physically, mentally, socially) of twenty-five thirteen to fourteen year old youngsters have signed up for this class entitled "Teen Topics" because they thought that it would be interesting.

The class is scheduled to meet the last period of the day on Tuesday and Thursday during the second semester. Arrangements have been made so that the class might take trips and students might have an opportunity to meet informally with the teacher after class.

Around the first of November your principal calls you in to tell you that, if you are interested, you have been chosen to teach the experimental class. You were chosen because of your background in adolescent psychology and your interest in helping youngsters with minor problems of adjustment typical of the young adolescent. You believe that the most efficient learner is the student who is relatively free from personal problems and thus can direct his attention to conventional school learning uninhibited by his personal concerns. You agree to take the class and believe that by being informed of your new teaching responsibility this early in the year that you will have adequate time to plan for the course.

Your principal has given you pretty much of a "free hand" to develop the content of the course and the activities in which the students will be engaged. A good supply of instructional materials (e.g., books on the adolescent and descriptions of similar programs in other schools) has been made available to you. There will be no direct supervision of your work, but an evaluation by students and yourself will be requested at the middle and close of the semester. Studies will also be made of the gain in personal adjustment evidenced by a selected number of your students. You do not know which students have been chosen for this study and will not know until the end of the semester. An experienced teacher-counselor has been asked by the principal to help you when and if you ask for help. The teacher-counselor will also help you evaluate your work and the program. The counselor knows each of the youngsters in the group well.

The Group:

Some of the youngsters who have signed up for the course know each other very well, having gone through school together. Three do not know anyone else in the group. Others are only casually acquainted. Members of the group have a variety of interests and abilities, and they represent many levels of competence and come from a variety of socio-economic backgrounds. The quality of their personality adjustment varies, but none is seriously maladjusted.

A. You have about eight weeks plus the Christmas vacation to plan for your class.

1. As you sit down for the first time to think through the work of the semester and plan the course you would:

    (a) Get hold of several good books on adolescent psychology and read them through to see what suggestions for a program you could get from experts in the field of adolescent psychology.

    (b) Survey the materials that will be available to you and think through a number of ways that such materials might be used by members of the class.

    (c) Consolt the cumulative records of students who will be in your class to see what other teachers have said about them and talk with the teacher-counselor to see what specific suggestions he has for planning your semester's program.

    (d) Read through copies of publications which describe how other schools have organized similar programs to get ideas which you could use to help you in planning your course.

2. During the third week in November the local newspaper carries a story about how an important civic group in the town has registered concern about the teaching of sex education in schools. You were planning to make sex education an important part of your course. At this point in your planning you would:

    (a) Continue planning as you have been.

    (b) Check with your principal to see how he felt about the matter and if you should continue with your planning.

    (c) Reserve judgment about what you should do and see if anything more is said in the papers or at school.

    (d) Consult the teacher-counselor to see if he has any ideas on how you should teach about sex education without causing an issue.

3. About three weeks before your class is scheduled to meet for the first time, your principal asks you to come in and talk with him about the course. You would hope that your principal would:

    (a) Say that if there was anything that he could do to be of help that you should feel free to call on him.

    (b) Indicate to you what he would hope the course would accomplish during the semester.

(c) Encourage you to talk about the purposes of your course as you see them after several weeks of planning.

(d) Make specific suggestions to help you in your planning, and encourage you to drop in for further suggestions if you need help.

4. The weekend before the beginning of the new semester it would be natural for you to feel:

(a) Some concern that your planning and preparation, extensive as it has been, may not have taken into account things that would be of value to your students.

(b) Anxious to get started with your class believing that your course would be one of the most important things that will happen to your students during their school years.

(c) That this was going to be your big opportunity to do something worthwhile and perhaps even get some recognition for it.

(d) That you have done the best job of preparation that you could under the circumstances and expect the best next Tuesday.

B. You will have your first meeting with the group tomorrow.

5. It will be important that you have planned for:

(a) students to get well acquainted with each other.

(b) explaining your grading system.

(c) activities to catch student interest.

(d) explaining your complete program for the semester.

6. The teacher-counselor drops by your room and asks if he can be of help. You would ask him for:

(a) his opinion about what you have planned for tomorrow.

(b) suggestions to help you make a good impression.

(c) suggestions as to what student reaction might be on the first day.

(d) nothing until you had an opportunity to meet with the group.

7. The more important personal information to gather at that first meeting would be:

(a) interests of the different students.

(b) parent or guardian, home address and phone number.

(c) what they would like to do in the course.

(d) why they are taking the course.

8. Of the things you would do the evening before meeting the class, the most essential would be to:

(a) Become familiar with the notes for such presentation as you might make.

(b) Become familiar with students' names and any information you might have about them from their files.

(c) Become familiar with the sequence and nature of any activities you may have planned.

(d) Be sure any materials you were to use were available and in good condition.

9. Your greatest concern on this night before the first meeting would be:

(a) How to appear poised and at ease.

(b) How to gain control of the group.

(c) How to handle problem pupils.

(d) How to get your program moving rapidly and well.

C. On meeting the group the first day a number of students come in from three to five minutes late. Following this, as you get your program underway, the students get restless.

10. With the students that come in late you would:

(a) Simply acknowledge their presence and noticeably mark them present in the record book.

(b) Inform them politely about the time at which the class starts.

(c) Ask them politely why they were unable to get to class on time.

(d) Make clear to the class as a whole and the late students in particular the standards you will maintain with regard to tardiness.

11. You would handle the restlessness of the group by:

(a) Presenting your program more dynamically.

(b) Asking students why they were restless.

(c) Speaking to the group firmly about paying attention.

(d) Picking out one or two of the worst offenders and reprimanding them.

12. You would tell the group who you were by:

(a) Telling them your full name.

(b) Telling your name and your educational and work experience.

(c) Telling your name and some of your personal adjustment problems at their age.

(d) Telling your name and some of your interests and some of your interests and hobbies.

13. You would, by your general behavior and manner, try to present yourself as:

(a) Efficient, orderly and business-like.

(b) Friendly, sympathetic and understanding.

(c) Firm and serious but fair.

(d) Understanding, friendly and firm.

14. You would prepare for the next meeting by:

(a) Discussing with pupils what they would like to do and deciding on one or two ideas.

(b) Telling them what pages to read.

(c) Giving students a choice of two ideas and determining in which the majority are interested.

(d) Discussing your plans for the next meeting with them.

D. You have met with your class four times and have made some observations. Two boys seem particularly and you have found that they come from a lower class slum area. One girl seems to be withdrawn. The students do not pay any attention to her. She is a pleasant looking, well dressed girl. There are four or five youngsters, apparently very good friends (both boys and girls), who do most of the talking and take most of the initiative. Students seem to continually interrupt each other and you.

15. In the interests of the two boys from the slum area you would:

(a) Find an opportunity to discuss the matter of cleanliness with the class.

(b) Speak to the boys about their need to be clean in a conference with them.

(c) Inaugurate a cleanliness competition with a prize to that half of the class with the best record, putting one boy in each half.

(d) Speak to the boys about their need to be clean and arrange facilities at school where they could clean up.

16. In the interests of the apparently withdrawn girl you would:

(a) Talk to her informally over a period of time to see if you could determine her difficulty.

(b) Call on her regularly for contributions to the discussion.

(c) Discover a skill she has and have her demonstrate for the class.

(d) Have a conference with her and tell her to become involved with the class discussion and speak up.

17. To improve the relationship of the group with the apparently withdrawn girl you would:

(a) Determine who, if anyone, is friendly with her and arrange to have them work together.

(b) Do nothing.

(c) Discuss with the class the general need for being friendly towards all classmates.

(d) Take some class leaders aside and ask them to make friends with her.

18. With regard to the four or five youngsters who do most of the talking and take the most initiative you would tend to believe:

(a) They are brighter than most of the other students.

(b) They are the leaders of the class.

(c) There is considerable variation in students' ability to participate in class.

(d) They are a little too cocky and think they know more than the others.

19. With regard to the tendency of class members to interrupt while others are talking you would:

    (a) Tell the class politely but firmly that interruptions are impolite and should not continue.

    (b) Discuss the matter with the class, determining why this happens and what should be done about it.

    (c) Organize a system of hand raising and set rules for student participation in discussion.

    (d) Set rules for student participation in discussion and firmly but fairly reprimand each person who breaks the rules.

E. At the beginning of the eighth class session (fourth week) Johnny comes into class holding onto his arm and very nearly crying. The tears are welled up in his eyes and he looks away from the others. You notice that Peter, the largest and strongest boy in the class, looks at Johnny occasionally with a sneering smile. You do not feel that you can let this pass, so you arrange to meet with Johnny and Peter separately after class.

20. You would tend to believe:

    (a) That Johnny probably did something for which this was just, but maybe severe, repayment.

    (b) That Peter is something of a bully.

    (c) That Johnny was hit on the arm by Peter.

    (d) That Johnny felt badly and Peter was quite aware of it.

21. When you meet with Johnny you would:

    (a) Engage him in conversation and lead slowly into the difficulty he had that morning.

    (b) Ask him in a friendly way why he was almost crying when he came into class.

    (c) Ask him if Peter hit him and why.

    (d) Tell him you were aware that he had some difficulty and offer your help to him.

22. When you meet with Peter you would:

    (a) Ask him if he and Johnny had had difficulty.

    (b) Make him aware that you knew he had trouble with Johnny and proceed from there.

(c) Tell him that Johnny was upset this afternoon and you had noticed that he (Peter) was looking strange--proceed from there.

(d) Make him aware that he is bigger and stronger than the other boys and that he is a bully if he picks on smaller boys.

23. To insure that this kind of thing did not happen again you would:

(a) Discuss bullying with the class.

(b) Do nothing.

(c) Get the two boys together to talk over the difficulty.

(d) Find the cause of the trouble and work with those involved to eliminate it.

F. In general your program has been moving along satisfactorily. After the eighth meeting you have a feeling that the students are beginning to lose interest. A number of students seem to be sitting through class without really getting involved. Others seem to stay interested and active. Your supervisor asks to see you informally over coffee.

24. When you meet with the supervisor you would:

(a) Not talk about your class or its present lack of involvement.

(b) Discuss your concern with him and listen for suggestions he might have.

(c) Speak about how satisfactory the early meetings had been.

(d) Allow supervisor to orient the discussion.

25. Your planning for the next (ninth) session would include:

(a) Some new ideas that you had not tried.

(b) Some clarification of the importance of students' doing well in their work.

(c) A request for ideas from students as to how to make the class more interesting.

(d) Ways to get more students actively doing something in the class.

26. During the ninth session you would:

(a) Keep a close watch on students to be sure they were attentive.

(b) By careful observation determine which students seemed disinterested.

(c) Behave much as you had in earlier sessions.

(d) Speak pointedly to those who were not attentive.

27. You would tend to believe the loss of interest was due to:

(a) Factors outside of the classroom such as weather, interest in other activities, etc.

(b) Your own inadequacy in stimulating the group.

(c) Failure of students to realize their responsibilities.

(d) A rather natural group reaction to the problems of working together on personal adjustment problems.

G. Before the mid-term (eighteenth) meeting of the class you take time out to think about the experiences you have had. The class has been good some days and poor other days. You have had no word from your principal about how your work has been. Your supervisor has seemed satisfied but not very much impressed with what you are doing. You have heard nothing about the children who are being studied. You are asked to meet with the children's parents to discuss the experimental class in an informal way.

28. You would be most concerned about:

(a) The lack of reaction from your principal.

(b) Your apparent failure to impress your supervisor.

(c) What you should say to the parents.

(d) What the studies of the children are showing.

29. You would resolve to:

(a) Discuss your progress with your supervisor.

(b) Ask for an appointment with the principal to find out how he feels about your work.

(c) Plan to work harder with your group.

(d) Not let the present state of affairs worry you.

30. When talking with theparents you would:

(a) Encourage them to ask questions about the program.

(b) Tell them what theprogram has consisted of so far.

(c) Tell them you don't know how well the program is going.

(d) Impress upon them the importance of student participation in the class activities.

31. In this case you would feel that parents:

(a) Ought to be told how their children are doing in this class.

(b) Ought not to become involved in such an experimental program.

(c) Are entitled to an opportunity to question you.

(d) Ought to be referred to those in charge of the experiment.

32. At your next class meeting.

(a) You would tell students what you told their parents.

(b) You would not initiate any discussion about your visit with the parents.

(c) You would discuss briefly the parents' interest in the class.

(d) You would tell the students that you expected more cooperation from them now that their parents were involved.

H. The nineteenth and twentieth class sessions are very unsatisfactory. You leave class at the end of the twentieth session with a number of doubts in your mind as to whether students are learning and making progress toward more adequate adjustment. You can see what you consider to be several major problems with the structure and organization or the class and believe that if these could be corrected or if you had done some things differently over the past few weeks that you would not have a problem with the class.

33. At this point you would:

(a) Decide to go to class thenext day and ask your students how they feel about the progress of the course.

(b) Think through the problem carefully and start planning revisions for the course next year.

(c) Try to help yourself accept the fact that life is often filled with disappointments and redouble your efforts to make your class better in the future by spending more time in preparation and encouraging your students to work harder.

(d) Mention your concerns at the next meeting of your class and encourage students to talk with you after class about the progress of the course.

34. You would feel much better regarding the accuracy of your estimate about what is wrong with the class if you:

(a) Were sure that some of the students were not being difficult on purpose to test your authority as a new teacher.

(b) Knew more about the expectations of your students and to what extent they felt their expectations of your students and to what extent they felt their expectations were being met.

(c) Could have a colleague in whom you could confide and in whom you could trust come in and observe your class and talk with you.

(d) Were sure of your own needs for success and the extent to which these needs influenced your feelings.

35. After the twentieth session, it would be natural for you to feel that:

(a) You wished that students accepted the fact that things that are taught them in schools are usually good for them even though they may not like what they are learning all of the time.

(b) You would like to go out for an evening of relaxation and think about the situation over the weekend.

(c) It must have been wonderful to teach in the good old days when students were in school because they wanted to learn.

(d) Things seldom go well all the time for everybody and that they couldn't be expected to always go well for you.

36. In an attempt to analyze the source of the problem you are having with your class you would:

(a) Have a conference with several of the brighter and more interested students to see if they could give you any insight into the problem.

(b) Have the students write an anonymous short essay on what they like and don't like about teachers and school.

(c) Ask the teacher-counselor to come in and observe your class several times and talk with you about his observations.

(d) Consult the cumulative records of the students to see if any had past records which would give a clue to their behavior.

I. At your twenty-fourth meeting you wish to make plans for a series of visits to different community health and welfare agencies. You want to be sure that the youngsters learn from the experiences and conduct themselves properly while traveling to and from and visiting in the agencies.

37. In order to assure that all youngsters learned from their first trip you would:

(a) Assign particular things for all of them to look for and listen to.

(b) Ask each to write a brief commentary on the most important things they saw or heard.

(c) Encourage them to ask questions while they are there.

(d) Present them with a check sheet of items to be seen and heard and ask them to check off those that they saw or heard.

38. In preparation for the first trip you would:

(a) Tell them as much as you could about the agency to which they were going.

(b) Tell them you were sure it would be interesting and fun and let them see and hear for themselves.

(c) Ask them what they thought they could expect and encourage guided discussions about their expectations.

(d) Tell them about the most interesting things they would see and hear.

39. To insure that the group conducted themselves properly you would:

(a) Set out rules of conduct for them.

(b) Ask them to behave as young ladies and gentlemen representing their school.

(c) Ask them what rules of conduct they would propose and develop a code with the group.

(d) Assure them that if they did not behave properly they would not go on trips in the future.

40. On the trip you would:

(a) Allow the youngsters to go where they wished when they wished, in the confines of the agency.

(b) Keep them all together as a manageable group.

(c) Divide them into small groups with a leader responsible for each group and arrange their itinerary and meetings after you got to the agency.

(d) Let the agency people take responsibility for deciding where they could go and when.

J. As you observe your class over an extended period of time, you get the feeling they are divided into three groups. The largest group consists of those persons who are most active in class and who generally assume the leadership roles. The second group consists of three boys who usually sit together at the back of the room. The third group contains two girls who usually sit alone. They seldom participate in the discussion.

41. In an effort to verify your observations regarding the structure of the group, you would:

(a) Make an intensive effort to study the group for several days, noting seating arrangement, conversations, etc.

(b) Plan to give a single sociometric test, asking "whom would you prefer to work with," etc.

(c) Talk privately to several of the students whose opinion you respect concerning the matter.

(d) Ask your teacher-counselor to spend a day with you and then discuss the situation.

42. In an effort to help the three boys who sit together at the back of the room become a part of this group, you would:

(a) Plan some activities and appoint them chairmen of the different groups.

(b) Ask them what problems most concern them.

(c) Have the class select a planning committee and then pass the problem to this group.

(d) Make a special effort yourself to speak to these boys and to draw them into the discussion.

43. Assuming that you wanted to help the two isolated girls, you would:

(a) Study the school records of each girl in an effort to determine the reasons they are isolated.

(b) Give the class a series of personality tests, and discuss the results with each student individually.

(c) Suggest the group work on Teen Age Problems," and discuss isolation, acceptance, rejection, etc.

(d) Assign a seating arrangement, and make certain that each girl sat next to at least one of the more popular students in the group.

44. 44. One of the most important problems facing you now is to do something which:

(a) Will insure that no one is rejected or disliked.

(b) Will result in everybody's being liked.

(c) Will encourage each person's acceptance of the others..

(d) Will guarantee that no one's feelings get hurt.

K. Your class has at last developed into a fairly cohesive unit. The discussions are more animated and everyone participates to some degree. Disagreements on ideas begin to appear, and the students give evidence of intense feelings on a number of issues. George has been particularly outspoken. He has very radical ideas that seem to provoke the other students who disagree with him. You often find yourself in disagreement with his point of view but know that the ideas he expresses have some support from some adolescent psychologists that you consider to be on the "lunatic fringe." George seldom gives in on a point.

45. You would believe that these conditions are likely to:

(a) Ultimately strengthen the group.

(b) Do little but make it uncomfortable until George learns his lesson.

(c) Destroy the group unity unless you intervene.

(d) Make it difficult for progress to be made for some students until they learn to accept George.

46. With regard to George you would:

(a) Refer him to the teacher-counselor.

(b) Politely but firmly keep him from agitating the class and, if this fails, call on him less often.

(c) Encourage him to express his ideas in ways that would not irritate other students.

(d) Point out to George that he is intolerant of the views of other class members.

47. With regard to the other students you would:

(a) Encourage them in their effort to stand up to George.

(b) Help them understand what George is doing to them and why.

(c) Help them to get onto topics and ideas where George could not disagree with them so forcefully.

(d) Get into the discussion on their side and show George that he is wrong.

48. With regard to your concern for George as a person, you would feel that:

(a) He is developing undemocratic traits by behaving as he does, and you would hope to help him change.

(b) He does not understand how to behave in a democratic setting and may need help.

(c) He probably has never learned certain social skills necessary for democratic group behavior and the possibilities of developing such skills should be shown him.

(d) He will learn sooner or later that in a democracy some ideas are undesirable because they tend to destroy the group.

Part II OPINIONNAIRE

The following is a survey of the opinions of people in general about a number of social and personal questions. Of course there are many different answers. The best answer to each statement below is your personal opinion. We have tried to cover many different and opposing points of view. You may find yourself agreeing strongly with some of the statements, disagreeing just as strongly with others, and perhaps uncertain about others; whether you agree or disagree with any statement, you can be sure that many other people feel the same as you do.

Mark each statement in the space provided on your answer sheet according to how much you agree or disagree with it. Please mark every one. Write +1, +2, +3, or -1, -2, -3, depending on how you feel in each case.

+1: I AGREE A LITTLE -1: I DISAGREE A LITTLE

+2: I AGREE ON THE WHOLE -2: I DISAGREE ON THE WHOLE

+3: I AGREE VERY MUCH -3: I DISAGREE VERY MUCH

1. A person who thinks primarily of his own happiness is beneath contempt.
2. The main thing in life is for a person to want to do something important.
3. I wish people would be more definite about things.
4. In a discussion I often find it necessary to repeat myself several times to make sure I am being understood.
5. Most people just don't know what's good for them.
6. A person who has bad manners, habits, and breeding can hardly expect to get along with decent people.
7. In times like these, a person must be pretty selfish if he considers his own happiness primarily.
8. A man who does not believe in some great cause has not really lived.
9. I work under a great deal of tension at times.
10. I'd like it if I should find someone who would tell me how to solve my personal problems.
11. Of all the different philosophies which have existed in this world there is probably only one which is correct.
12. Whether it's all right to manipulate people or not, it is certainly all right when it's for their own good.
13. It is when a person devotes himself to an ideal or cause that his life becomes meaningful.
14. In this complicated world of ours the only way we can know what is going on is to rely upon leaders or experts who can be trusted.
15. If people would talk less and work more, everybody would be better off.
16. There are a number of persons I have come to hate because of the things they stand for.

+1: I AGREE A LITTLE -1: I DISAGREE A LITTLE

+2: I AGREE ON THE WHOLE -2: I DISAGREE ON THE WHOLE

+3: I AGREE VERY MUCH -3: I DISAGREE VERY MUCH

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17. There is so much to be done and so little time to do it in.

18. It is when a person devotes himself to an ideal or cause that he becomes important.

19. It is better to be a dead hero than a live coward.

20. A group which tolerates too much difference of opinion among its own members cannot exist for long.

21. The businessman and manufacturer are much more important to society than the artist and the professor.

22. It is only natural that a person should have a much better acquaintance with ideas he believes in than with ideas he opposes.

23. While I don't like to admit this even to myself, I sometimes have the ambition to become a great man, like Einstein, or Beethoven, or Shakespeare.

24. Plain common sense tells you that prejudice can be removed by education, not legislation.

25. Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary at times to restrict the freedom of certain political groups.

26. If a man is to accomplish his mission in life it is sometimes necessary to gamble "all or nothing at all."

27. A person must be pretty stupid if he still believes in differences between races.

28. Most people just don't give a "damn" about others.

29. A person who gets enthusiastic about a number of causes is likely to be a pretty "whishy-washy" sort of person.

30. Do unto others as they do unto you.

31. To compromise with our political opponents is dangerous because it usually leads to the betrayal of our own side.

32. If given the chance I would do something that would be of great benefit to the world.

33. The trouble with many people is that they don't take things seriously enough.

34. In times like these it is often necessary to be more on guard against ideas put out by certain people or groups in one's own camp than by those in opposing camps.

35. In a heated discussion I generally become so absorbed in what I am going to say that I forget to listen to what the others are saying.

36. It bothers me when something unexpected interrupts my daily routine,

37. Once I get wound up in heated discussion I just can't stop,

+1: I AGREE A LITTLE -1: I DISAGREE A LITTLE

+2: I AGREE ON THE WHOLE -2: I DISAGREE ON THE WHOLE

+3: I AGREE VERY MUCH -3: I DISAGREE VERY MUCH

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38. There are two kinds of people in this world: those who are on the side of truth and those who are against it.

39. What the youth needs is strict discipline, rugged determination, and the will to work and fight for family and country.

40. Man on his own is a helpless and miserable creature.

41. The United States and Russia have just about nothing in common.

42. I set a high standard for myself and I feel others should do the same.

43. In the history of mankind there have probably been just a handful of really great thinkers.

44. The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.

45. Appreciation of others is a healthy attitude, since it is the only way to have them appreciate you.

46. The present is all too often full of unhappiness. It is the future that counts.

47. Unfortunately, a good many people with whom I have discussed important social and moral problems don't really understand what is going on.

48. People who seem unsure and uncertain about things make me feel uncomfortable.

49. Fundamentally, the world we live in is a pretty lonely place.

50. It is often desirable to reserve judgment about what's going on until one has had a chance to hear the opinions of those one respects.

51. In general, full economic security is bad; most men wouldn't work if they didn't need the money for eating and living.

52. The worst crime a person can commit is to attack publicly the people who believe in the same thing he does.

53. In the long run the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's one.

54. The American re-armament program is clear and positive proof that we are willing to sacrifice to preserve our freedom.

55. Most of the ideas which get published nowadays aren't worth the paper they are printed on.

56. It is only natural for a person to be rather fearful of the future.

57. Most of the arguments or quarrels I get unto are over matters of principle.
58. My blood boils whenever a person stubbornly refuses to admit hd's wrong.
59. When it comes to differences of opinion in religion we must be careful not to compromise with those who believe differently from the way we do.
60. America may not be perfect, but the American way has brought us about as close as human beings can get to a perfect society.

Name of Your Teacher______________________Your Age______Date________

Name of Your School_________________Boy or Girl_______Grade and Section_______

PUPIL OPINION QUESTIONNAIRE

The questions below are about your teacher today. Please put a check mark in front of the sentence which seems to fit your teacher best. Please check only one space for each question. No one, not even your teacher, will ever see your answers so you can be completely honest without having to worry about the information being passed on.

1. The teacher seems to be mostly concerned with

_______talking about the lesson. _______finding out what we know.

_______telling us what to do. _______finding out what we want to do.

2. The teacher seems to be

_______firm and businesslike. _______strict and harsh.

_______easygoing and cheerful. _______good natured and easy to please.

3. The teacher seems to want

_______to do most of the talking. _______us to make our own plans.

_______the students to do the talking. _______to make our plans for us.

4. When we give our ideas the teacher usually

_______tells us they are no good. _______does not listen to them.

_______tells us they are good. _______lets us talk about them.

For the following questions, please put a circle around the number that best tells how you think about your teacher.

5. Does your teacher talk more than the class does?

1	2	3	4	5	6	7	8	9
a lot more				about the same				less than the students

6. How often does the teacher use the ideas and suggestions of the class?

1	2	3	4	5	6	7	8	9
not at all				about one half the time				all the time

7. How often does the teacher tell the class that something they have done is not good?

1	2	3	4	5	6	7	8	9
quite a bit				a little				not at all

Name of Student Teacher______________________________

Date__________________

9. Of the talking going on in this class, the student teacher seems to be talking:

1	2	3	4	5	6	7	8	9
far less than the students								much more than the students

10. The talk of the students in the class seems to be:

1	2	3	4	5	6	7	8	9
their own ideas and opinions								response to teacher's questions

11. This student teacher gives information and his (her) own ideas:

1	2	3	4	5	6	7	8	9
very little								quite a bit

12. This student teacher seems to be:

1	2	3	4	5	6	7	8	9
very competent								very incompetent

13. It is my feeling that the students' reactions to this student teacher are:

1	2	3	4	5	6	7	8	9
very favorable								very unfavorable